



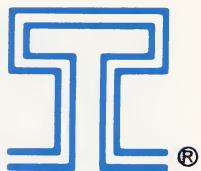
COMPANY LITERATURE

CONTENTS
Company Literature
Section

ATSU'S CORPORATE ASSOCIATE MEMBERS (1979)

COMPANY	INDEX TAB	NUMBER OF ENTRIES*
ADP Network Services	10. ADP-Cyphernetics	
American Terminal Leasing	13. American	
Avco Computer Services	32. AVCO.....	1
Boeing Computer Services Company	9. Boeing	
CallData Systems	24. CallData	9
Citibank-Interactive Computing Center	17. Citibank.....	1
Corporate Time-Sharing Services, Inc.	33. Corporate	
Datanetwork, Honeywell, Inc.	31. Datanetwork	1
General Electric Information Services Co.	5. GE	
Informatics-Data Services Division.....	11. Informatics	
Inesco Systems Corporation	30. INSCO	1
I.P. Sharp Associates Limited.....	18. I.P. Sharp	
Litton Computer Services	20. Litton	
Metrocom Inc.	25. Metrocom	1
Minicomputer Modeling, Inc.	14. Minicomputer Modeling	1
National Computer Network	27. National	
On-Line Systems, Inc.	15. On-Line	5
Quantum Science Corporation		
R.A.I.R., Inc.		
Rapidata, Inc.	8. Rapidata	2
Scientific Time-Sharing Corporation	2. Scientific	7
SDC Search Service	34. SDC Search	
Sun Information Services	35. Sun	
Telenet	1. Telenet	2
Tentime Company	19. Tentime	
Time-Sharing Resources, Inc.	23. TSR	2
Trendata.....	6. Trendata	3
United Computing Systems	3. UCS	7
University Computing Company	36. UCC	5
Vocal Interface	4. Votrax	5
Warner Computer Systems	12. Warner	
WU Data Services Company	26. WU Data Services	3
Zeta Research	22. Zeta	2

*See Contents - Vol. 1 for listing of entries and for filing instructions.



The Telenet Report

Telenet Communications Corporation, 1050 17th St., N.W., Washington, D.C. 20036, (202) 637-7900

Volume 4, Number 1, March 1977

FCC Approves Telenet as International Carrier

In a precedent-setting decision, the Federal Communications Commission has approved Telenet as an international common carrier, granting authority to extend packet-switched data communications service from the United States to the United Kingdom and points beyond. The ruling was the first in which the FCC has authorized a new international carrier since the establishment of the Commission in 1934.

Telenet's application to provide network service to the UK was filed in May 1976 and was strongly supported by domestic Telenet customers, including the New York Times Information Bank, Scientific Time Sharing Corpora-

tion, Bechtel International Corporation, the Gillette Compay, CallData Systems, Lockheed Information Systems, First Data Corporation and Interactive Sciences Corporation.

In order to make Telenet's service available to other countries at the earliest possible date, Telenet is also working together with international record carriers to interconnect with appropriate overseas IRC data links.

In February Telenet signed an interconnection agreement with RCA Global Communications, Inc., the largest of the international record carriers, providing for the extension of Telenet packet service to overseas points as expeditiously as possible.



Signing the first operating agreement for extension of Telenet's packet service overseas are Robert Angliss, Executive Vice President of RCA Globecom, at left, and Roger Goetz, Vice President of Marketing at Telenet.

Network Will Expand to 85 Cities in 1977

Thirty-seven new Telenet Central Offices are planned this year, bringing the number of North American cities served directly by the network to 85 by the end of 1977.

By June public and private dial ports and leased line ports will be available in Charlotte, NC; Louisville, KY; Raleigh, NC; and Sacramento, CA. At the same time, private dial and leased line ports will become available in 33 other cities, as shown in the table. Public dial-in service will be added in these cities on a phased basis during the period from July 1977 through March 1978. Further expansion of the network to additional cities is anticipated during this period in response to specific customer requirements.

In other areas, FX and leased lines connected to the nearest Telenet Central Office, and nationwide In-WATS service, are alternative means of providing economical access for network users.

(See Schedule page 2)

Hotline Service Begins in June

Beginning in June, Telenet will offer Hotline data service — the functional equivalent of a private leased line.

Like private leased lines, charges will be at flat monthly rates for unlimited traffic. Unlike conventional leased lines, the cost will not increase with distance.

Telenet's Hotline service works like this. A user leases a leased line access port. When the terminal user turns his terminal on, the network automatically establishes a connection to a pre-specified network address, typically a remote host computer. The remote device may be connected to the network in any one of several different

New City Schedule

City	Private Dial and Leased Line Ports	Public Dial Ports
Charlotte, NC	2nd quarter, 1977	2nd quarter, 1977
Louisville, KY	2nd quarter, 1977	2nd quarter, 1977
Raleigh/Durham, NC.....	2nd quarter, 1977	2nd quarter, 1977
Sacramento, CA	2nd quarter, 1977	2nd quarter, 1977
Ann Arbor, MI	June, 1977	3rd quarter, 1977
Birmingham, AL	June, 1977	3rd quarter, 1977
Dayton, OH	June, 1977	3rd quarter, 1977
Fort Worth, TX.....	June, 1977	3rd quarter, 1977
Jacksonville, FL	June, 1977	3rd quarter, 1977
Memphis, TN	June, 1977	3rd quarter, 1977
Nashville, TN.....	June, 1977	3rd quarter, 1977
Orlando, FL	June, 1977	3rd quarter, 1977
San Bernardino/Riverside, CA	June, 1977	3rd quarter, 1977
Tampa, FL	June, 1977	3rd quarter, 1977
Madison, WI.....	June, 1977	4th quarter, 1977
Norfolk, VA	June, 1977	4th quarter, 1977
Oklahoma City, OK.....	June, 1977	4th quarter, 1977
Omaha, NE.....	June, 1977	4th quarter, 1977
Oxnard/Ventura, CA	June, 1977	4th quarter, 1977
Pasadena, Ca.....	June, 1977	4th quarter, 1977
Providence, RI.....	June, 1977	4th quarter, 1977
Richmond, VA.....	June, 1977	4th quarter, 1977
St. Petersburg, FL.....	June, 1977	4th quarter, 1977
Syracuse, NY.....	June, 1977	4th quarter, 1977
Tulsa, OK.....	June, 1977	4th quarter, 1978
Akron, OH	June, 1977	1st quarter, 1978
Allentown, PA	June, 1977	1st quarter, 1978
Austin, TX	June, 1977	1st quarter, 1978
Ft. Lauderdale, FL.....	June, 1977	1st quarter, 1978
Paterson/Passaic, NJ	June, 1977	1st quarter, 1978
San Antonio, TX	June, 1977	1st quarter, 1978
Springfield, MA	June, 1977	1st quarter, 1978
Toledo, OH	June, 1977	1st quarter, 1978
Trenton, NJ	June, 1977	1st quarter, 1978
Tucson, AZ	June, 1977	1st quarter, 1978
Wilmington, DE.....	June, 1977	1st quarter, 1978
Winston-Salem/Greensboro, NC.	June, 1977	1st quarter, 1978
Youngstown, OH.....	June, 1977	1st quarter, 1978

Hotline Service

(Continued from page 1)

ways — through a Telenet Access Controller, a synchronous "multi-connection" channel or over a single asynchronous access line.

Hotline service for 110-300 bps ports will be priced at \$50 per month, plus the normal port and access line charges. It will be available at all Telenet Central Offices, as well as on private Telenet Access Controllers (TACs) located on customer premises. At high, medium and low-density Central Offices, Hotline ports will cost

\$125, \$160 and \$205 respectively, per month. Hotline ports on private TACs will be \$75 per month.

Users with many hours of traffic per day between distant stations will find Hotline service highly economical. Traffic-independent rates will also be attractive for applications involving polling messages to remote stations. For example, polled teletypewriter terminals can be connected to local Telenet Central Offices over leased access lines, and at a total cost of \$227 per terminal per month, have unlimited use of direct virtual connections to a central-site computer.

Furnival Heads Operations



Richard Furnival

Richard Furnival joined Telenet as a Vice President in September, with responsibility for overall operations of the network, customer service and common carrier relations. Furnival was previously involved in operations management of two specialized common carriers, MCI and DATRAN where he was also Vice President of Operations.

Marketing Staff Expands

The marketing staff and the technical support staff, both in the field and at the Network Control Center in Washington, have undergone a major expansion in recent months to keep pace with the growing demand for network service and customer computer installations.

A new sales office has been opened in Des Plaines, Ill. to serve the increasing number of new customers in the Midwest. Gerard Offenbacher, formerly with DATRAN, heads the office.

Two additional sales representatives have joined the New York sales office: Richard Ciarelli, who was previously with Datapoint, and Sy Ringel, formerly with National CSS. New in the Boston area is Ken Bower, who also came to Telenet from DATRAN.

The systems engineering staff, which provides technical support for customer planning and installation, has been expanded as well, with Allen Seltzer joining the Boston office from Data Resources, Inc.; Peter Czegledi, a recent computer sciences graduate of Queens College, the New York office; and Dipak Basu, previously with American Telecommunications Corporation, the Los Angeles Office.

Telenet Connections

BRS

A new bibliographic information retrieval service began serving subscribers in early 1977, using the Telenet network for long distance communications. Called Bibliographic Retrieval Services, Inc., the Schenectady-based company provides on-line access to 11 major bibliographic databases in the social and physical sciences, business and engineering. It is the only commercial service to offer the MEDLARS data base, compiled by the National Library of Medicine.

The Information Bank

In a major expansion of its service, the New York Times Information Bank recently connected its computerized



data base of current affairs to Telenet. The network makes the Information Bank economically accessible throughout North America from a wide range of data terminals operating at 110 to 1200 bps.

The Information Bank has become an indispensable tool for researchers, businessmen, government officials, journalists — anyone who needs to obtain background information on recent events quickly. The data base contains over one million abstracts from *The New York Times*, dating back to 1969, and from 65 other English-language newspapers and periodicals in a variety of fields.

Headquartered in Parsippany, NJ, the Information Bank also maintains offices in New York, Washington, D.C., San Francisco, and Chicago.

Merit Computer Network

The MERIT Computer Network, which connects computer centers at Michigan's three largest state universities, has widened its circle of users nationwide with Telenet.

The MERIT Network links three large systems: the University of Michigan's Amdahl 470V/6, Michigan State University's CDC 6500, and Wayne State University's IBM 360/67. Statewide network interconnections to each host computer are provided through mini-computers (PDP 11/20's) at each university. The PDP 11/20 at Wayne State also serves as the inter-network gateway to Telenet, permitting users anywhere in the country to access any of the three MERIT computers.

The recent additions of MERIT, the Triangle Universities Computation Center in Raleigh, N.C., Gallaudet College in Washington, D.C., and Rice University in Houston, Texas brings the number of university systems using Telenet to 15.

One Hundredth Computer Signs on to Network

When the first packets started crossing the network in August, 1975, the best estimate was that 100 computers would be using Telenet by mid-1977. That best estimate proved wrong when seven months ahead of time, TRW Business Credit Services signed up its IBM 370/158 in Anaheim, California.

Telenet's 100th is used for the National Credit Information Service (NACIS), operated by TRW for the National Association of Credit Management and its more than 39,500 members of affiliated associations across the country. It is the first fully automated national business credit reporting service which enables member firms to retrieve instant credit experience reports on their business customers from a terminal right in their office or at their NACM - affiliated association.

It made good business sense for us to use Telenet as the NACIS communications network, according to Jim Holly, Vice President and General Manager of TRW/BCS. Key factors were a lower cost per hour compared with existing private network facilities, widespread access throughout the country, and the network's ability to handle a wide variety of terminals.

The NACIS computer is actually the second TRW-related computer to use the network. The first is operated by

the TRW Systems and Energy Group for in-house computing applications.

Expansion of the Telenet network — its facilities and people — have all been accelerated to meet the demand

for service. A revised "best estimate" is that 200 customer computers will be using the network by the end of 1977 — and no one would mind being proven wrong again.



Jim Holly, Vice President and General Manager of TRW/BCS, shows how quickly business credit reports can be retrieved by dialing the NACIS computer over the Telenet network. With him are Rod Davis, Telenet sales representative in Southern California, at left, and Roger Goetz, Vice President for Marketing at Telenet.

Four CallData Computers Work Nationwide on Telenet

In July 1975, CallData Systems, Inc., of Woodbury, New York, introduced a new name, CallData™, into the commercial computing services business. A year later it ranked as the 20th largest firm in the industry with revenues of \$12 million and projections for reaching the top ten by 1980.

CallData's parent company, Grumman Data Systems Corporation, was one of the key factors in the company's rapid growth. As one of the largest computer service and software contractors in the country, Grumman contributed its technical and management expertise.

Another key factor, according to Kurt Thoss, Director of Marketing, was the availability of the nationwide Telenet public network which enabled CallData to offer its services outside the northeast without committing itself to extensive private leased line communications and multiplexing facilities.

Over 500 Applications

CallData operates five separate computer facilities which in turn offer five program libraries and over 500 major applications in industry, business, education, government, engineering, and scientific fields. In addition, the firm maintains separate computer facilities to service its parent company and other sister subsidiaries of Grumman Corporation.

Four of these computer complexes have been connected to Telenet. They include the DTSS service operating on a dual processor Honeywell 635 and CallData's TS*RJE Timesharing service on an IBM 370/155M2, both at company headquarters on Long Island, New York. Also connected to the network are the Computility timesharing service based on three DEC system-10's and a Call Data SDPS subsidiary offering a second IBM 370/155, all located in the Boston/Waltham area.

Along with two remote batch computing services utilizing IBM 370/168 and CDC Cyber systems, also on Long Island, CallData offers complete facilities for timesharing, batch and remote job entry as well as micrographics and automated publication services.

One of CallData's most popular products is F*A*C*T*S, a total management, accounting and control sys-

tem for retail stores available via the DTSS service. According to Thoss, F*A*C*T*S is unique in that it is the only complete on-line service designed specifically for multi-location stores in the 1 to 10 million dollar revenue range.

Another interesting CallData offering, its Leximatic™ Service, was designed to help law firms and corporate legal departments manage data involved in large scale litigations. Typical cases involve 50,000 to several million documents. With Leximatic online via the TS*RJE Timesharing System (IBM 370/155), documents are abstracted and indexed by a number of parameters so that they can be retrieved and correlated via a common data base from multiple locations.

Interactive personnel management systems are a third application that a nationwide network has made economically viable for multi-location corporations. CallData's PERPAK program, which is offered on the Computility system, is used by companies to track compliance with government standards for equal opportunity employment programs as well as to maintain records for all company personnel.

Thoss sees the ability to market nationwide as one of the greatest advantages of connecting to Telenet. CallData already has seven district sales offices and the nationwide availability of Telenet access will enable the company to expand their sales effort even further in a cost-effective manner during 1977.

CallData and Leximatic are registered trademarks of CallData Systems, Inc.

Rates Announced for U.S. - Mexico Service

Computer communications service between the United States and Mexico was inaugurated in February by Telenet and Teleinformatica de Mexico, S.A. (TIMSA).

The Telenet-TIMSA interconnection will make available a reliable and economical communications service for data collection, information retrieval and time sharing services. In typical applications, users will realize a cost

savings of 50 percent or more compared with other available transmission facilities.

Rates for U.S.-Mexico service in a tariff filed with the Federal Communications Commission are \$5.30 per kilopacket, regardless of distance. Each kilopacket contains up to 128,000 characters of user data. Network access in Mexico is available over leased line ports at monthly rates established by TIMSA and approved by the Secretariat of Communications and Transportation (SCT) of the Mexican Federal Government.

An authorized agent for data transmission services in Mexico, TIMSA operates a domestic packet network under a contract with SCT. The company also offers a wide variety of interactive and data base retrieval applications covering Mexican topics.

Further information about U.S.-Mexico service is available in the United States from any Telenet regional sales office and in Mexico, from TIMSA, located at Arenal 40, Chimalixtac, Mexico 20, D.F. (Telephone 905/550-7076).

WATS Provides Nationwide Access for Terminal Users

No matter where you are in the United States, if you have a terminal and a telephone, you can reach a computer center connected to the Telenet network through a special 800 In-WATS telephone number.

Designed for terminal users outside Telenet's local dialing areas, the new In-WATS service cuts average long distance communications costs by 20 to 30 percent. Tariff rates are \$14.00 an hour or approximately 23 cents a minute. This figure includes the regular network access port charge.

WATS access has been extremely popular right from the beginning. Since the December start of service, the number of lines has been increased several fold to keep up with the increasing demand.

Telenet offers two options for billing WATS calls — directly to the terminal user or to the computer service that he accesses. An optional Caller Identification Feature, using passwords and identification numbers, is also available so that customer with computers on the network can screen and identify In-WATS users.

A User's Guide

TO COMPUTER-BASED SERVICES VIA TELENET

There are more than 65 data banks, commercial service bureaus and college/university computing centers that make their services available to the public over the Telenet network. If you would like specific information about what each organization has to offer, just contact the person listed.

Data Banks

Bibliographic and statistical information retrieval services.

Bibliographics Retrieval Services, Inc.
1462 Erie Blvd.
Schenectady, NY 12305
Ronald P. Quake, President
518/374-5011

Lockheed Information Services
Code 5020/201
3251 Hanover Street
Palo Alto, CA 94304
Fran Spigai
800/227-1960

National Library of Medicine
8600 Rockville Pike
Bethesda, MD 20014
Grace McCarn
301/496-6193

The New York Times Information Bank
1719A Route 10
Parsippany, NJ 07054
Sales Department
201/539-5850

SDC Search Service
2500 Colorado Avenue
Santa Monica, CA 90406
William Burgess
800/421-7229

State University of New York
99 Washington Avenue
Albany, NY 12205
Kenneth Hapeman
518/474-3751

Commercial Service Bureaus

Firms offering time sharing and specialized application programs

Alphatect Incorporated
Five Third Street
San Francisco, CA 94103
Richard D. Whitesell
415/546-9380

American Information Services

Unit of American Can
American Lane
Greenwich, CT 06830
V.W. Renz
203/552-3174

American Management Systems, Inc.

1515 Wilson Blvd.
Arlington, VA 22209
James D. Wester
703/841-6030

Anistics

640 Fifth Avenue
New York, NY 10019
Dick Raas, Vice President
212/541-6050

Bowne Time Sharing

160 Water St.
New York, N.Y. 10038
William Mahony
212/952-4400

CallData Systems, Inc.

20 Crossways Park North
Woodbury, NY 11797
Kurt Thoss
Director/Marketing
516/575-3298

CITIDATA

16633 Ventura Boulevard
Suite 1210
Encino, CA 91346
Robert G. Gottesman
Director
213/990-3377

Compu-Serv Network, Inc.

500 Arlington Centre Blvd.
Columbus, OH 43220
Robert Tillson
614/457-8600

Computer Sharing Services, Inc.

2498 West 2nd Avenue
Denver, CO 80223
L.E. O'Leary
303/934-2381

Computeristics Inc.

Middlebury, CT 06749
R.C. Westberry
313/336-3700

Concap Computing Systems

7700 Edgewater Drive
Oakland, CA 94621
Ronald K. Sawyer
415/635-5750

After you have made arrangements with a subscriber organization, you can connect to its computer by dialing into the Telenet network. See the listing of local Telenet access numbers on the reverse side. For users outside local dialing areas, Telenet also offers a special 800 In-WATS number.

Corporate Services Inc.

3410 E. McDowell Road
Mesa, AZ 85203
Don R. Horrocks
602/833-0980

CTS/PCS Timesharing

3333 New Hyde Park Road
New Hyde Park, NY 10040
Jack Cahill
516/684-3475

Data Communications, Inc.

P.O. Box 998
Goleta, CA 93017
Craig Pennington
805/967-0413

Data Resources, Inc.

29 Hartwell Avenue
Lexington, MA 02173
Donald McLagan
617/861-0165

Dr. Dvorkovitz and Associates

PO Box 1748
Ormond Beach, FL 32074
904/677-7033

E DI Computer Services

13693 East Iliff Avenue
Denver, CO 80232
Michael Niernberg or Ray Frank
303/758-4619

Energy Enterprises of Denver, Inc.

475 17th Street
Denver, CO 80202
Jim Bjornstad
303/893-1116

Envirotech Information Systems

15 North West Temple
Salt Lake City, UT 84103
Ken Carter
801/533-8384

First Data Corporation

40 Second Avenue
Waltham, MA 02154
Anne Drazen
617/890-6701

I. P. Sharp Associates

183 Main Street, E
Suite 1150
Rochester, NY 14604
Fletcher McTaggart
716/546-7270

Inscos Systems Corporation

3501 Route 66
Neptune, NJ 07753
John M. Tym
201/922-1100

Interactive Management Systems, Inc.

375 Concord Avenue
Belmont, MA 02178
Gregory W. Wallace

Interactive Sciences Corporation

60 Brooks Drive
Braintree, MA 02184
Joann Sexton, Mgr./Corp. Services
617/848-2660

Itel Corporation/Leasing Division

One Embarcadero Center
San Francisco, CA 94111
Gary Koenig
415/983-0488

Logic Systems, Inc.

4100 Southwest Freeway
Suite 102

Houston, TX 77081

D.L. Richardson

713/621-4051

Management Services, Inc.

Three Corporate Square
Suite 100

Atlanta, GA 30329

George R. Herring

404/321-0820

Marshall & Swift Publication Co.

1617 Beverly Blvd.
Los Angeles, CA 90026

Robert Pollack

213/624-6451

MJK Associates

2600 Augustine Drive
Santa Clara, CA 95051

Michael A. Marriott

408/247-5102

Multiple Access, Inc.

747 Third Avenue
New York, NY 10017

John Petrucci

212/832-3224

Multiple Access Computer Service

885 Don Mills Road
Don Mills, Ontario M3C 1W2
Canada

Don Mattson, Mgr./Mktg. Services

416/443-3939

NACIS
100 Oceangate Blvd. #700
Long Beach, CA 90802
213/435-3541

National Computer Network of Chicago

1929 N. Harlem Avenue
Chicago, IL 60635

Len Bole

312/622-6666

Programmed Business Systems

718 Third Street

White Bear Lake, MN 55110

Tom O'Connor

612/426-3235

Robert Heller Associates, Inc.

715 Broadway

New York, NY

212/777-4500

Scientific Process & Research, Inc.

400 Cleveland Avenue

Highland Park, NJ 08904

Dr. Imrich Klein, President
201/846-3477

Scientific Time Sharing Corp.

7316 Wisconsin Avenue

Bethesda, MD 20014

Robert Schmidt, Mktg.
301/657-8220

Standard Information Systems Inc.

36 Washington Street

Wellesley Hills, MA 02181

Dorothy Curran

617/237-2910

Time Sharing Resources, Inc.

777 Northern Blvd.

Great Neck, NY 11022

Peter J. Fasulo
516/487-0101

Timeshared Business Systems

3031 Tisch Way, #301

San Jose, CA 95128

Reinhard Siedenburg
408/246-6565

Timesharing Associates

2420 N. Huachuca Drive

Tucson, AZ 85705

M. Ernest Huber or Jay Lowe
602/795-9820

Gallaudet College Computer Center

7th & Florida Ave., NE
Washington, DC 20002

Kevin B. Casey

202/447-0519

Massachusetts Institute of Technology

Room 39-575
Cambridge, MA 02139

Brenda Ferriero

617/253-4102

MERIT Computer Network

108 Cooley Building
2355 Bonisteel Boulevard
Ann Arbor, MI 48109

Eric Aupperle

313/764-9423

University of Michigan Computing Center

1075 Beal Avenue
Ann Arbor, MI 48109

Business Office

313/764-2121

Michigan State University Computing Laboratory

E. Lansing, MI 48824

Dr. Tom Carroll

517/353-7228

Wayne State University Computing & Data Processing Center

5950 Cass Avenue
Detroit, MI 48202

Dr. Barbara Wolfe

313/577-4777

New Jersey Institute of Technology

323 High Street
Newark, NJ 07102

Prof. Murray Turoff
201/645-5352

Rice University Institute for Computer Services

Houston, TX 77001

Priscilla Jane Huston or Farrell Gerbode

713/527-4005

Stanford Center for Information Processing

Stanford University

Encina Hall, #30

Stanford, CA 94305

Peter Vesanovic

415/497-3105

Triangle Universities Computation Center (TUCC)

Box 12076

Research Triangle Park

NC 27709

Joe R. Ragland

919/549-0671

University of California at Los Angeles Health Sciences Computer Facility

Dept of Biomathematics

AV-111 CHS

Los Angeles, CA 90024

Ari Ollikainen

Mgr./User Services

213/825-5213

Yale University Computer Center

175 Whitney Avenue

New Haven, CT 06520

Edward J. O'Neill or Gredyon C. Freeman

203/432-4080

Other

In-house systems offering computer time to outside users on a limited basis.

Acme Hardesty Company, Inc.

910 Fox Pavilion

Jenkintown, PA 19046

Carl Marbach

215/885-3610

Bolt Beranek and Newman

50 Moulton Street

Cambridge, MA 02138

Stephen G. Chipman

617/491-1850

Raytheon Company Scientific Computer Center

Hartwell Road

Bedford, MA 01730

R.M. Nacamuli, Asst. Mgr.

617/274-7100

Telenet Dial-in Access Numbers

110-300 bps adaptive speed ports.

Arizona

Phoenix 602/257-1552

California

Los Angeles

Central & East 213/624-5230

West & Valley 213/822-9287

South &

Long Beach 213/549-5150

Orange County 714/558-6061

Sacramento 916/486-1881

San Diego 714/231-1922

San Francisco 415/362-6200

San Francisco

Peninsula 415/595-0360

San Jose 408/279-8450

Colorado

Denver 303/623-0876

Connecticut

Hartford 203/522-0344

New Haven/

Bridgeport 203/789-0211

Stamford 203/357-1800

District of Columbia

Washington 202/347-1400

Florida

Miami 305/374-6400

Georgia

Atlanta 404/577-8911

Illinois

Chicago 312/372-4901

Indiana

Indianapolis 317/635-9630

Louisiana

New Orleans 504/568-1840

Maryland

Baltimore

301/962-5010

Massachusetts

Boston

617/338-1400

Michigan

Detroit

313/961-5115

Minnesota

Minneapolis

612/339-0150

Missouri

Kansas City

816/474-1600

St. Louis

314/231-8800

New Jersey

Newark

201/623-6818

New York

Albany

518/445-9111

Buffalo

716/847-0600

Long Island

516/292-0320

New York

212/736-7205

Rochester

716/454-3430

White Plains

914/682-8777

Ohio

Cincinnati

513/621-7017

Cleveland

216/241-0940

Columbus

614/463-1400

Oregon

Portland

503/243-2800

Pennsylvania

Philadelphia

215/574-0620

Pittsburgh

412/765-2681

Texas

Dallas

214/748-0127

Houston

713/224-3380

Utah

Salt Lake City

801/364-2644

Washington

Seattle

206/624-9780

Wisconsin

Milwaukee

414/271-2560

Canada

Montreal

110bps

514/878-9975

134.5 bps

514/878-9977

300 bps

514/878-9971

Ottawa

110 bps

613/563-9625

134.5

613/563-9629

300 bps

613/563-9639

Toronto

110 bps

416/361-1728

134.5 bps

416/361-1515

300 bps

416/361-0011

1200 bps ports

Boston

617/338-7495

Chicago

312/726-1957

Dallas

214/748-6371

Los Angeles

213/624-1521

New York

212/736-1800

San Francisco

415/956-5777

Washington, DC

202/347-6093

Telenet Communications Corporation

Corporate Headquarters

1050 17th Street, N.W.

Washington, D.C. 20036

202/637-7900

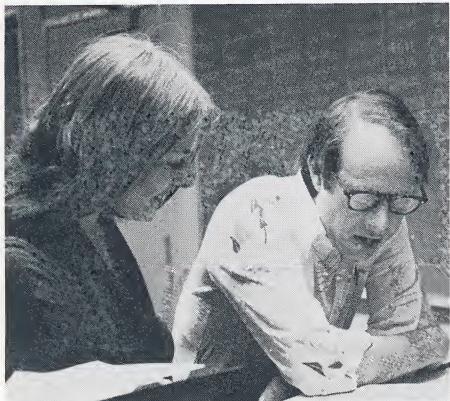
Around-the-Clock Customer Service Keeps Network Reliability High

At 2 o'clock one morning a computer technician at a company on the West Coast received a call from the Telenet Network Control Center in Washington, D.C. It was the Network Controller alerting him that the company's computer had lost its connection with the network. After recovering from his surprise, the technician explained that there was probably nothing wrong — his computer was simply down for routine maintenance!

The ability to spot potential problems and to do something about them before they affect the quality of service is the key to the high reliability of the network. Telenet's early warning system is controlled by two Prime 300 computers located at the NCC and by a staff of network controllers and customer service representatives who are on duty around the clock, seven days a week.

TIP Reports

Every 15 minutes each Telenet Interface Processor (TIP) in a Central Office reports on the status of its associated network lines, its neighboring TIPs and TACs (Telenet Access Controllers) and customer computers as well as on its own environment, down to the temperature level of the Central Office where it is located. These reports are printed out on a bank of consoles that are scanned continually by the NCC staff.



Peggy Karp goes over daily reports with Tom Ralston, Customer Services Supervisor.

The TIPs are programmed to take care of many potential problems on their own, without human intervention. For example, if there is a software failure in any TIP, it can be restored in minutes by automatically re-

loading the TIP's software from neighboring TIPs. The TIPs themselves control routing of traffic, automatically bypassing congested or temporarily out-of-service network lines.



Network access lines can be checked out remotely from special test positions.

When further detective work is required, the Telenet Debugging Tool comes into play. This special diagnostic program often makes it possible to pinpoint the exact source of trouble, which could be in the network itself, in customer equipment or local telephone lines, and to take corrective action remotely. Temporarily malfunctioning dial ports or terminal ports, for example, can be "busied out," preventing their use. Common logic control cards on customer TACs and Telenet Central Office TACs can be remotely switched to standby; individual channel cards can be looped remotely to help diagnose the cause of a problem.

If a problem appears to be in a local telephone line or a user's terminal, the NCC has a special test position where distortion tests can be run with the customer's assistance. Many marginally malfunctioning user terminals have been identified using these tests.

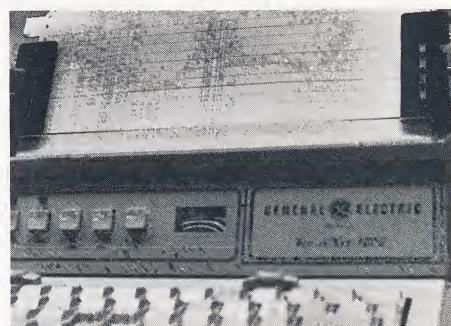
As powerful as Telenet's "intelligent network" software is, it still hasn't figured out how to change a channel card in a Telenet Access Controller or how to replace a power supply. For this reason there is a staff of field engineers at major Telenet switching centers who, if need be, can be dispatched speedily to a customer's site to repair network equipment, and most important, customer service representatives available by telephone 24 hours a day.

Hotline Number

The "hotline" to the Customer Service Group is 202/347-2424. Anyone who uses the network — computer operations staffs or individual terminal users—is encouraged to call this number with questions, suggestions and trouble reports relating to the use of the network.

Calling Customer Service directly is the fastest way to get any situation resolved, emphasizes Peggy Karp, who, as Manager of Systems Support, organized this group and the Systems Specialist Group who support it.

Peggy urges users to call Customer Service immediately whenever they are experiencing difficulties, leaving their terminals on-line. Two bits of information are invaluable to the Customer Service Operators — the network address of the computer being used and the identification number of the dial-in port. (This number is printed on the user's terminal at call set-up time.)



Any changes in network status are printed out at the Network Control Center.

An alternative to calling by telephone is connecting to the Customer Service message terminal at network address 202 CS and leaving the essential information along with your name and phone number. The message will be responded to by telephone within minutes.

Those who have used Customer Service have learned to expect prompt action. Most situations can be resolved within a few minutes. In those few cases where more time is required to clear a problem, alternative arrangements can be made for accessing the network so that there is no interruption of service.

Customer Service and the Systems Specialist Group also coordinate customer installations and acceptance testing and can answer virtually any question that a new user may have about using the network.



Free Directory

Telenet has published a 42-page directory of data banks, commercial service bureaus and colleges and universities that provide dial-up access to their computer facilities over the nationwide Telenet network.

The directory is designed as a "yellow pages" for interactive computing and information retrieval services. More than 40 organizations are cross-referenced by application specialties, programming languages and data base offerings.

Single copies of the directory are available free of charge by filling out the enclosed reply card.

Telenet, Datapac, and Transpac Support X.25

In October 1976, the CCITT endorsed the multi-national effort of its Study Group VII and adopted the X.25 specification as the international standard for interfacing computers, intelligent terminals, terminal controllers, and other programmable devices to public packet switching networks.

Since that time, X.25 support has been implemented by both the Trans-Canada Telephone System in its Datapac network, and by Telenet. Development of X.25 interface support is also underway in the French PTT's Transpac network, scheduled for service within a year. Carriers in other countries in Western Europe and in Japan are also committed to furnishing X.25 support in their public packet networks.

A number of computer terminal manufacturers are presently developing X.25 interface support for their systems, both to interconnect these systems to public networks and for use within private networks. (The X.25 protocol is "symmetric" and permits any

two devices which support the protocol to intercommunicate.) IBM World Trade, for example, recently announced the availability of X.25 support on an RPQ ("request for price quotation") basis, for users with IBM SNA networks. Other mainframe vendors are expected to announce similar interfaces in the near future.

Further information about X.25 is available from Dr. Barry Wessler, Director of Network Interfaces, at Telenet.

In-House Systems Represent Private Side of Telenet

Some of the leading corporations in the country are using the Telenet public network to provide data communications for in-house computer applications. These companies and other organizations operating computer centers for private applications represent about 50 per cent of all network subscribers.

Corporate users such as Bechtel, Gillette, PPG Industries, and Xerox, and government agencies such as NASA and the Federal Home Loan Bank Board reap a number of benefits from their network affiliation:

- the ability to implement new applications quickly without investing time and capital in private communications facilities.

- the ability to handle peak traffic loads without having to operate a lease line network that would be under-utilized much of the time.

- elimination of routine tasks involved in network management, such as dealing with multiple carriers, maintenance, and collection of traffic statistics.

- the ability to add new terminal and computer locations immediately and to provide for future growth.

Applications

In addition to general time sharing, these private subscribers are using the network for various text editing functions, such as proposal writing and report generation; for message processing, data entry and data base management systems, and specialized in-house applications in insurance, banking and manufacturing.

Some companies, such as Raytheon and Acme Hardesty, use the network to market excess computer capacity as well as for their own internal needs.

Others, such as American Can, have used their expertise in computing and their large-scale facilities to form and operate separate commercial service units on the network.

A major group of corporate subscribers utilize the DTSS software system and its ready-made synchronous interface to the Telenet network. DTSS software, furnished by DTSS Inc. of Hanover, NH, is a coordinated group of programs that form a complete operating system which runs on the Honeywell Series 600 Model TS 6350 and Series 6000 systems. Among the seven DTSS systems on the network are those operated by General Motors, Hughes Aircraft, Singer Company, and Union Carbide.

The TMEP network interface program, developed and supported by Telenet, is a second popular interface operating on more than a dozen IBM systems.

Telenet's optional Private Network Feature provides an additional level of security beyond internal password identification codes. With the Private Network Feature, the network automatically restricts access to a given host computer to a list of authorized terminal users.



Telenet
Communications
Corporation

Corporate Headquarters

1050 17th Street, NW
Washington, DC 20036
202/637-7900

Sales Offices:

Boston	617/890-0202
Chicago	312/298-2188
Los Angeles	213/477-2048
New York	212/594-6644
Washington	202/637-7900
San Francisco	415/854-5845

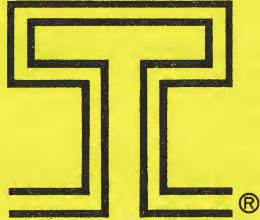
Network Control Center
Washington, DC
Customer Service 202/347-2424

How to Use

Telenet

The Public
Packet-Switched
Network for Data Communications

Information for Terminal Users



**Telenet Communications
Corporation**
Corporate Headquarters
1050 17th Street, NW
Washington, DC 20036

Telephone: 202/637-7900

Regional Sales Offices:

New England
Boston, MA 617/899-4478

New York-New Jersey-Penn
New York, NY 212/594-6644

Central-Southeast
Washington, DC 202/637-7900

Southwest-Southern California
Los Angeles, CA 213/477-2048

Northwest-Northern California
Menlo Park, CA 415/854-5845

Telenet Customer Service
Telephone: 202/347-2424

Telenet Sign-On Procedure

The instructions below explain how to connect to your computer through Telenet if you are using an ASCII-type terminal. If you are using a selectric-based terminal (like the IBM 2741), or if you are accessing an APL service for either class of terminal, Steps 1 and 3 will be different. See Notes. In the example: **[]** = your response. **[CR]** = carriage return. All other messages are automatically sent by Telenet.

Steps	Example	Notes
1. Turn on the terminal and coupler.		(1) Selectric-based terminals: switch to OFFLINE or LOCAL.
2. Dial local Telenet number.		(2) Telenet will have local dial-in service in more than 60 cities in the coming months. For a current list, contact your computer service or any Telenet office.
3. Send two carriage returns.	[CR] [CR]	(3) Step three identifies the speed and code at which your terminal is operating. The appropriate speed/code detectors are: (a) ASCII terminals [CR] [CR] ASCII/APL application [CR] [] [CR] (b) Selectric-based terminals (first switch to REMOTE or COMM) [] [CR] Selectric/APL application [] [CR]
4. Telenet will identify itself and ask you to identify your terminal. Type in the four character ID for your terminal, followed by a carriage return.	TELENET 202 DL 9	(4) A list of Terminal Model Identifiers is included in this folder. If it does not contain an ID for your terminal, just enter a carriage return. In most cases this will work satisfactorily. Use of the four character ID, however, ensures the best performance for your terminal.
5. Type a C for "connect", skip a space, and type the network address of the computer, followed by a carriage return.	@ [C] [] [] [] [] [CR]	(5) The Telenet address for the computer you wish to reach is available from your computer service.
6. Telenet will respond with a connection message. You are now ready to begin your conversation with the computer.	(address) CONNECTED	(6) If a connection cannot be made immediately, Telenet will print out an explanation. See list of Network Messages.
7. To disconnect Log off as usual. Telenet will in most cases send a "DISCONNECTED" message, indicating that your computer connection through the network has been terminated. Hang up to disconnect from Telenet.	(address) DISCONNECTED	(7a) Three number groups may appear along with the disconnect message. They indicate: connect time in minutes and seconds; packets received; and packets sent. (7b) The disconnected message returns you to Telenet. At this point you may request a connection to another computer on the network without redialing. (7c) If you did not automatically receive a disconnect message—and you wish to use another computer on the network—you can disconnect from the first computer by entering: [CR] @ [CR] @ [D] [CR] (address) DISCONNECTED

FOR TERMINALS WIRED DIRECTLY
TO TELENET
After your terminal has been turned on,
begin with Step 5.

Terminal Model Identifiers

Enter the identification for your terminal model in response to network inquiry
TERMINAL =

Terminal Model	Identifier
Anderson Jacobson 630	AJ63
Anderson Jacobson 841	†
Computer Devices CDI 1030	CD30
Computer Transceiver Execuport 300	CT30
Computer Transceiver Execuport 1200	CT12
Datapoint 2200	DP22
Datapoint 3000	DP30
Datapoint 3300	DP33
DECwriter	DECW
Data 100 73	DT73
General Electric TermiNet 30	TN30
General Electric TermiNet 120	TN12
General Electric TermiNet 300	GE30
General Electric TermiNet 1200	GE12
Hazeltine 2000	HZ20
IBM 2740/2741 EBCD (with type:)	
963, 996, 998	IBM1
938, 939, 961, 962, 997	IBM2
942, 943	IBM3
947, 948	IBM4
IBM 2740/2741 Correspondence (with type:)	
001, 005, 007, 008, 012, 202, 030,	IBM5
050, 053, 067, 070, 085	IBM6
006, 010, 015, 019, 059, 090	
021, 025-029, 031-039, 060, 068,	
086, 123, 129-145, 156, 161	IBM7
043, 054	IBM8
IBM 3767	†
IBM 5100	†
Imlac PDS-1	IML1
Infoton Vista Standard	IFVS
Infoton Vista Display	IFVD
Memorex MRX 1240	MX40
Research Inc. Teleray 3300	RI33
Tektronix 4010	TK10
Tektronix 4013	TK13
Tektronix 4023	TK23
Teletype Model 33	TT33
Teletype Model 35	TT35
Teletype Model 37	TT37
Teletype Model 38	TT38
Teletype Model 40	TT40
Teletype Inktronics	TTIN
Texas Instruments 725	TI25
Texas Instruments 733	TI33
Texas Instruments 735	TI35
Trendata 1000	†
Univac DCT 500	UV50
Video Systems 1200	VS12
Video Systems 5000	VS50
† same as IBM 2741	

Network Commands

When you are talking to Telenet (in Telenet "command mode"), you may use any of the following network commands or their abbreviations (boxed):

C ONNECT a request for connection to the computer address that follows

D ISCONNECT to disconnect from your computer system

CR @ CR to interrupt your computer conversation and return to Telenet command mode

C ONTINUE to return to your computer conversation after you have been in Telenet command mode

HALF . DUPLEX to stop the network from echoing keyboard input on ASCII terminals

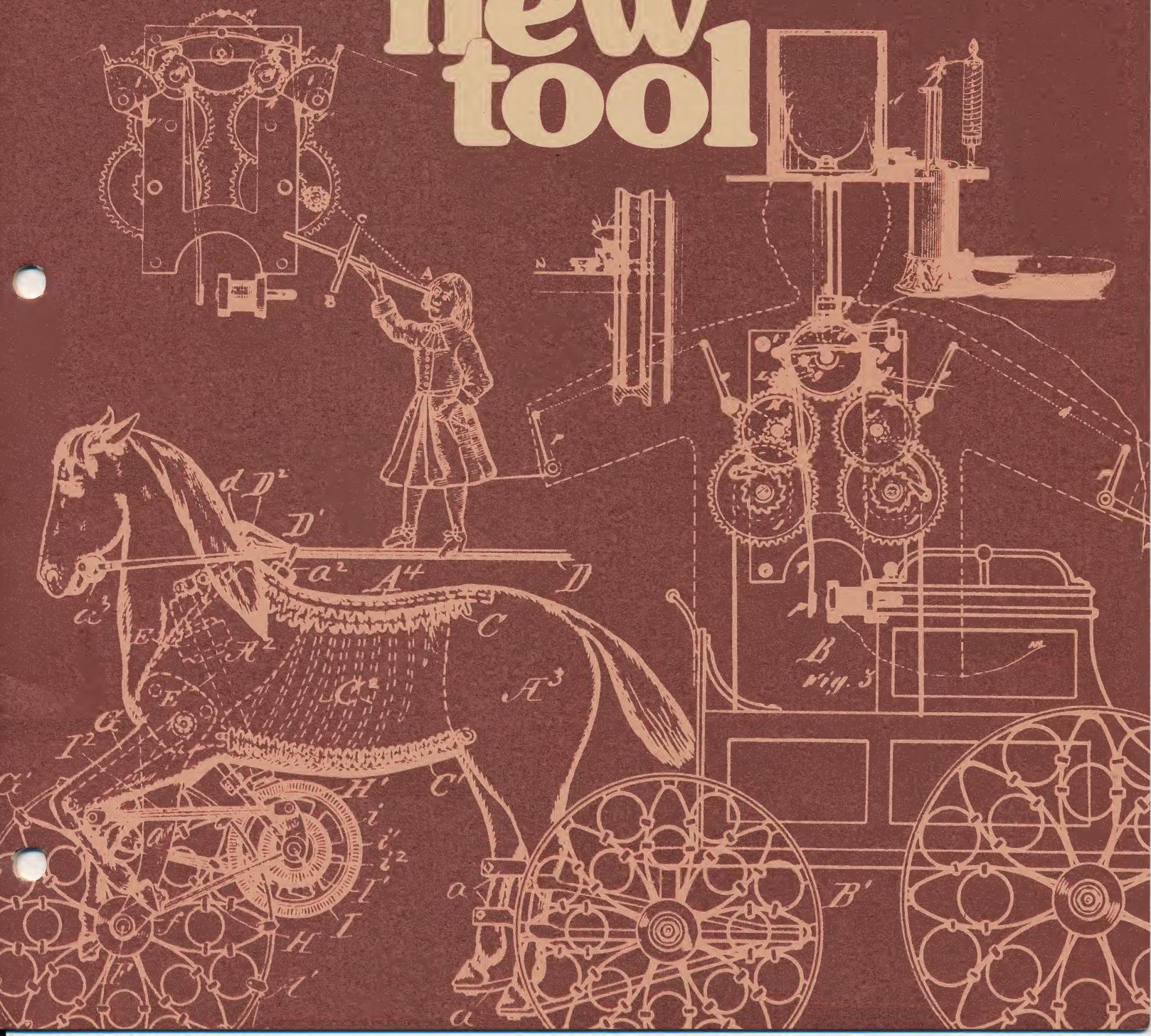
FULL . DUPLEX to echo keyboard input on ASCII terminals

Explanation of Network Messages

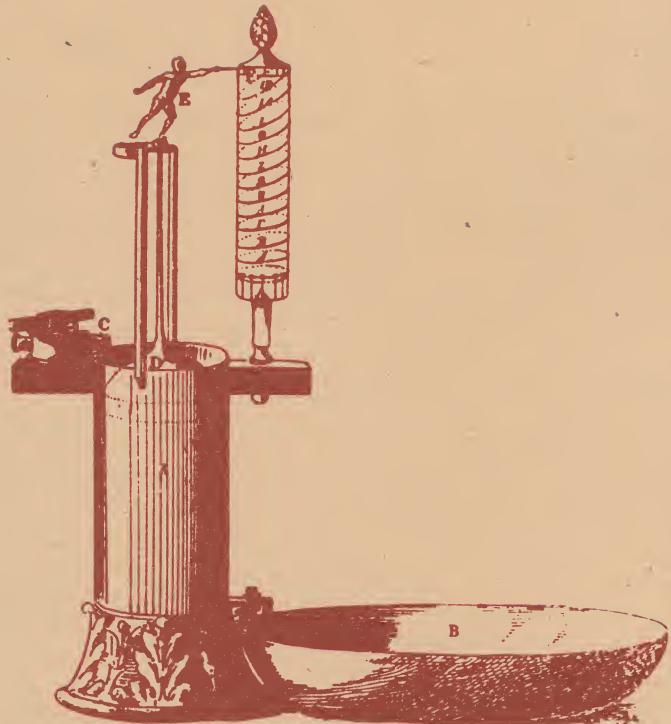
@	A Telenet prompt character indicating that the network is waiting for a command	(address) STILL CONNECTED	The terminal is still actively connected to this address. You must disconnect before initiating another connection
TERMINAL=	Request for user to enter terminal model identifier	(address) STILL PENDING	The terminal has a request for connection to this address pending. You must disconnect before initiating another connection.
In response to CONNECT command:			
(address) CONNECTED	The connection between your terminal and the computer has been established successfully	SUBPROCESS UNAVAIL- ABLE	The specific process included as part of address is not available
(address) BUSY	All computer ports are in use	NOT CON- NECTED	No suspended connection exists and the command is ignored
(address) DOES NOT SUPPORT TERMINAL	The computer system is refusing the connection because of the terminal model or mode		
ILLEGAL ADDRESS	The computer system address is invalid because it identifies a non-existent system		
ILLEGAL DESTINA- TION ADDRESS	Connection to this address is not permitted		
ILLEGAL SOURCE ADDRESS	The computer system will not communicate because of the terminal's address		
(address) NOT AVAILABLE	The computer system is operating but is actively refusing to permit the terminal to connect		
(address) NOT OPERATING	No connection can be made because the computer system is not operating		
(address) NOT REACHABLE	The computer system cannot be reached because intervening components are out of service		
(address) NOT RESPOND- ING	The computer system is operating but not acknowledging the terminal's request to connect		
(address) REFUSED COLLECT CONNEC- TION	The computer system is not willing to accept the charges for the connection		

SCIENTIFIC TIME SHARING CORPORATION

APL*PLUS®
the
new
tool



Man has a drive to develop new tools to improve his life, advance his capabilities, and increase his productivity. Often amusing, frequently absurd, but always determined, this striving for a better way—a better method—a better tool—has been a key to progress. This brochure concerns one of man's newest and most effective tools...APL*PLUS Service.



APL*PLUS IS A REGISTERED SERVICE MARK OF SCIENTIFIC TIME SHARING CORPORATION.

COPYRIGHT © 1975, 1976 SCIENTIFIC TIME SHARING CORPORATION

“In simple manners all the secret lies”

Edward Young (1683-1765)

Think, if you will, about a programming language that lets you build working programs in hours and days instead of weeks and months—a language in which you can become proficient in days—even if you aren’t a professional programmer.

This language is so simple that one character does as much as an entire statement in other languages.

The language is APL, and it is so powerful and versatile that many users say it renders obsolete such languages as Cobol, Basic, Fortran, and PL/I.

APL was conceived at Harvard in the late 1950’s and implemented at IBM in 1966. In 1969 a number of the leading proponents of APL formed Scientific Time Sharing Corporation.

Developments by Scientific Time Sharing, in areas such as secure database management and simplified report generation, have made our proprietary APL*PLUS Service more widely used for commercial applications than for scientific problem solving. Partially as a result of this leadership, APL today is the world’s fastest growing general purpose programming language.

Scientific Time Sharing Corporation is the world leader in APL time sharing.

"A quantitative change of an order of magnitude is a qualitative

What makes APL*PLUS

With APL*PLUS Service you can write a program in 1/5th the time it takes in other languages, such as Fortran and Cobol. Yet it's easier to learn and use than Basic. How can this be?

Simplicity. In general, one character in APL is equal to an entire statement in other programming languages. This is possible because, unlike other programming languages, APL is not restricted to a few mathematical symbols and to English.

Instead APL can express data processing operations in a manner that is even more concise and consistent than traditional mathematical notation. For example, the sums of each of the rows in a very large table called A are $+/A$. The sums of the columns are $/+A$. The grand total of all the numbers in the table is simply $+/A$. Sorting and other common operations are just as simple.

To do these operations in most other languages, you would have to know in advance the size of the table and set up a counter to keep track of progression through the table—in other words, a program "loop". Notice, in the comparisons below, what a difference this makes.

computing the average of a set of numbers

BASIC

```
10 DIM X (100)
20 LET S=0
30 READ N
40 FOR I=1 TO N
50 READ X (I)
60 LET S=S+X(I)
70 NEXT I
80 LET A=S/N
90 PRINT A
100 DATA
```

XXX END

FORTRAN

```
DIMENSION X (100)
READ (5,10) N, (X(I), I=1,N)
FORMAT (15, (E15.2))
S=0.0
DO 9 I=1,N
9 S=S+X(I)
A=S/N
WRITE (6,20) A
20 FORMAT (E15.2)
END
```

APL

$X+\square \times (+/X)\div pX$

BASIC

```
10 DIM X (100), Y(100)
20 READ N
30 FOR I=1 TO N
40 READ X (I)
50 NEXT I
60 FOR I=1 TO N
70 LET A=X(I)
80 LET L=I
90 FOR J=1 TO N
100 IF A>X(J) THEN 130
110 LET A=X(J)
120 LET L=J
130 NEXT J
140 LET Y (I)=A
150 LET X (I)=100000
160 PRINT Y (I)
170 NEXT I
180 DATA
```

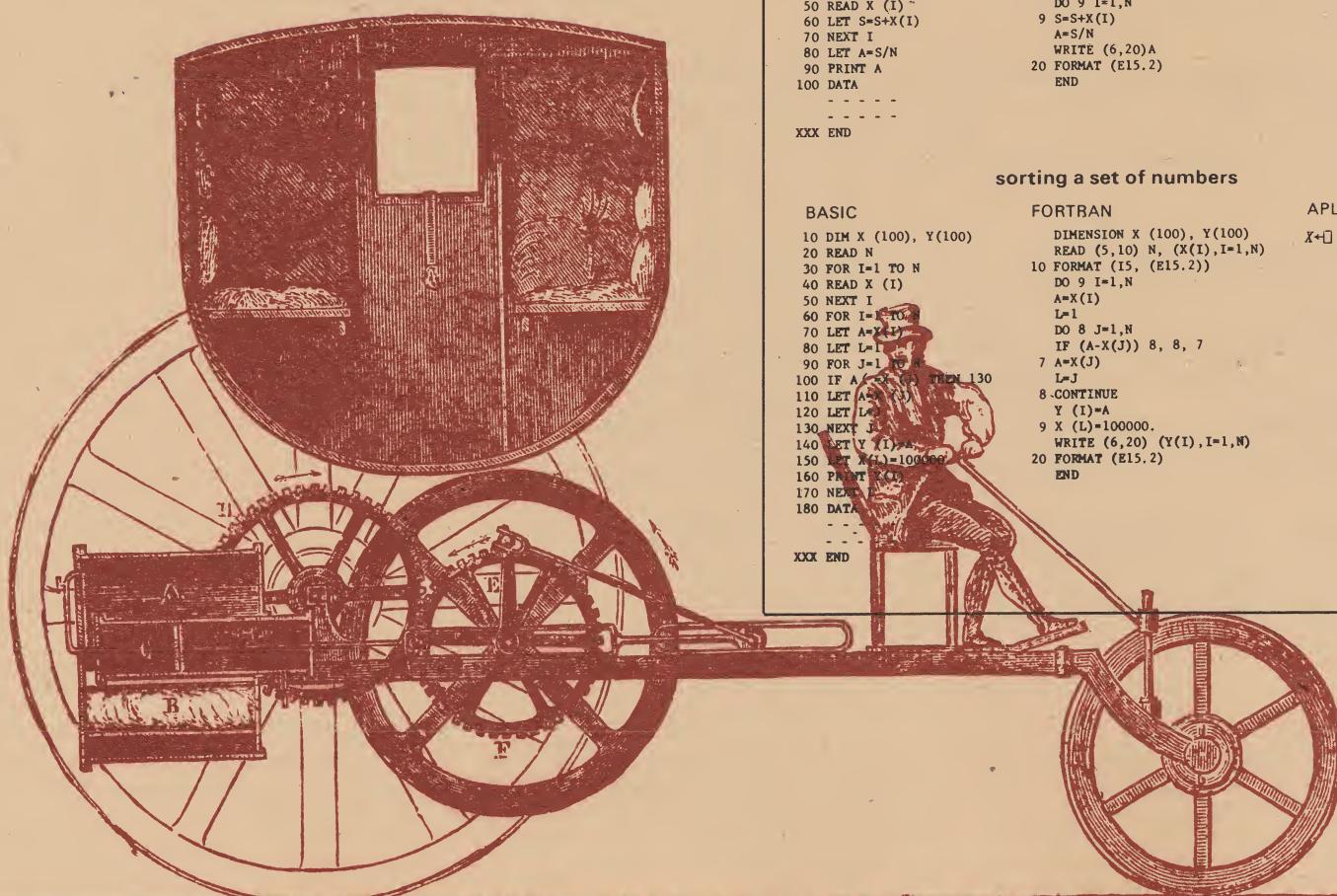
XXX END

FORTRAN

```
DIMENSION X (100), Y(100)
READ (5,10) N, (X(I), I=1,N)
10 FORMAT (15, (E15.2))
DO 9 I=1,N
A=X(I)
L=1
DO 8 J=1,N
IF (A>X(J)) 8, 8, 7
7 A=X(J)
L=J
8 CONTINUE
Y (I)=A
9 X (L)=100000.
WRITE (6,20) (Y(I), I=1,N)
20 FORMAT (E15.2)
END
```

APL

$X+\square \times X[\Delta X]$



change."

so powerful?

Why is a simpler program statement of any importance? Experts point out:

- The frequency of program errors varies more than linearly with program size.
- A programmer can fully comprehend only about one page of his program at a time.
- The more powerful, or terse, or succinct a language is for a given application, the smaller the amount of additional documentation that will be required.



A programmer working in APL is more likely to find major cost-saving short cuts in his approach to solving a problem.

Efficiency. If you can write a program in 1/5th of normal time, you've given yourself some valuable alternatives:

- You can start to program a low cost working model of an idea as soon as the initial design concept is conceived.
- Programming can be a means of developing firm specifications. You can explore alternative approaches and throw away an inadequate design. It's axiomatic that you never fully know what you want a major program to do until you use it. With APL, you acquire user experience in the very early stages of a project.
- Feedback from end users improves the design, assures currency and acceptance of the design, and facilitates training.
- Management achieves more control over the programming process instead of being told: "It's too late to make a change."

Any program that's useful will need to be changed. APL*PLUS is designed for change. APL*PLUS programs can even be written or changed by other APL*PLUS programs.

Appeals to Problem Solvers. APL removes the mystery of using a computer. As a result, more than any other language, APL appeals to the ultimate user as well as the computer professional. Thousands, who would not otherwise make direct use of the computer in their work, find APL to be natural. Often, it's faster to solve the problem in APL than to describe it to someone else. Many persons use APL to build "box of tools" programs to solve problems frequently encountered in their professions. APL is easily extended into user-oriented languages and systems.

Because of its broad appeal, APL achieves a unique economy of man and computer. And man's work becomes more enjoyable. In fact, APL is fun! It's not surprising that many users comment that APL has helped them advance in their careers.

These are some of the companies that have switched to APL*PLUS Service . . . and why.

IBM
WESTCHESTER
EMPLOYEES
FEDERAL
CREDIT UNION

Your people have made our conversion to a real time accounting base a pleasure.

CARBORUNDUM

Alan Rusin, Assistant Treasurer: I used Basic for 1½ years for financial problems. I am not a professional programmer. I have written programs in APL that I would not have attempted in Basic due to prolonged debugging time. Running costs of APL are comparable to Basic. Most certainly, costs of developing and modifying APL programs are significantly less.

SUN LIFE
INSURANCE
COMPANY
OF AMERICA

Ideally suited for new product development and other actuarial work where quick turnaround time and programming ease are essential.

CONTINENTAL
CAN COMPANY

A general ledger application for all plants in the metals division. 26 data entry locations. Originally, APL used 2,500 statements vs. an estimated 13,000 to 16,000 for the same program in Fortran. Cost benchmarks came in at 30% to 40% of the estimated cost of running in Fortran.

THE ROUSE
COMPANY

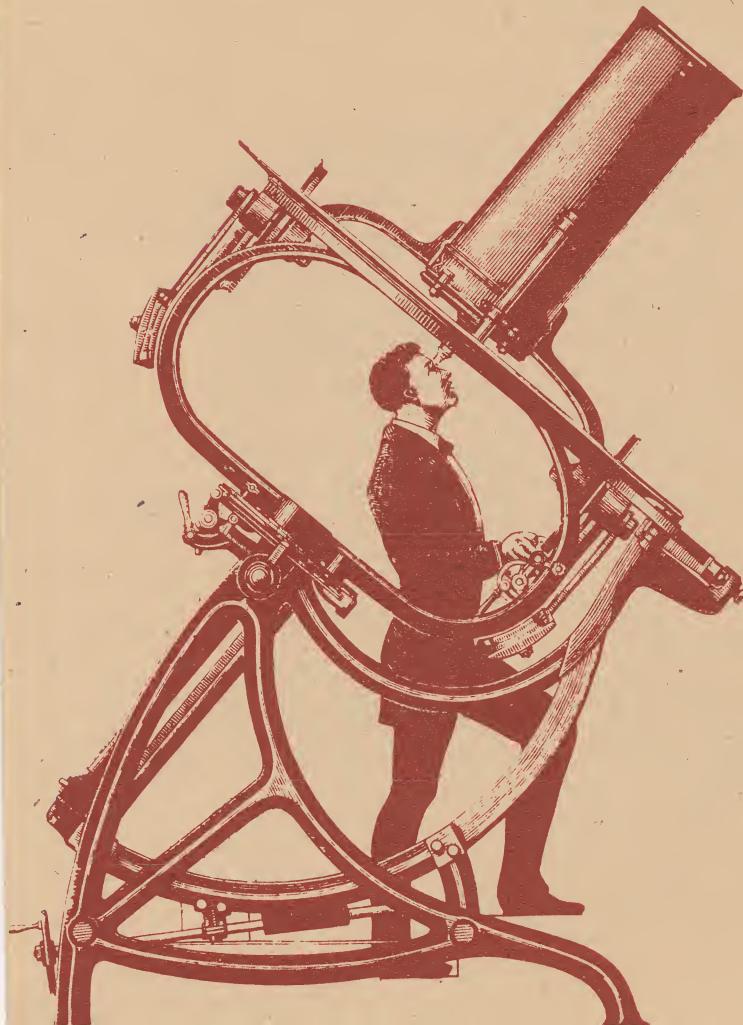
Capability for economic modeling has become a key element in executive-level planning and negotiations.

MUTUAL
BENEFIT
LIFE

George Cherlin, Associate Mathematician: Because APL*PLUS is the most powerful actuarial programming language available.

VENTURA
COUNTY
MENTAL
HEALTH
SERVICES

We have developed an on-line Management Information System (MIS) that tracks in a unified manner the patient's demographic, medical and financial information. Scheduling of patients and clinicians is also incorporated in the MIS. The MIS produces reports covering demographic analysis, program evaluation and patient care, and also performs the billing of patients.



Billions of bytes on-line... proven security... easy to access...

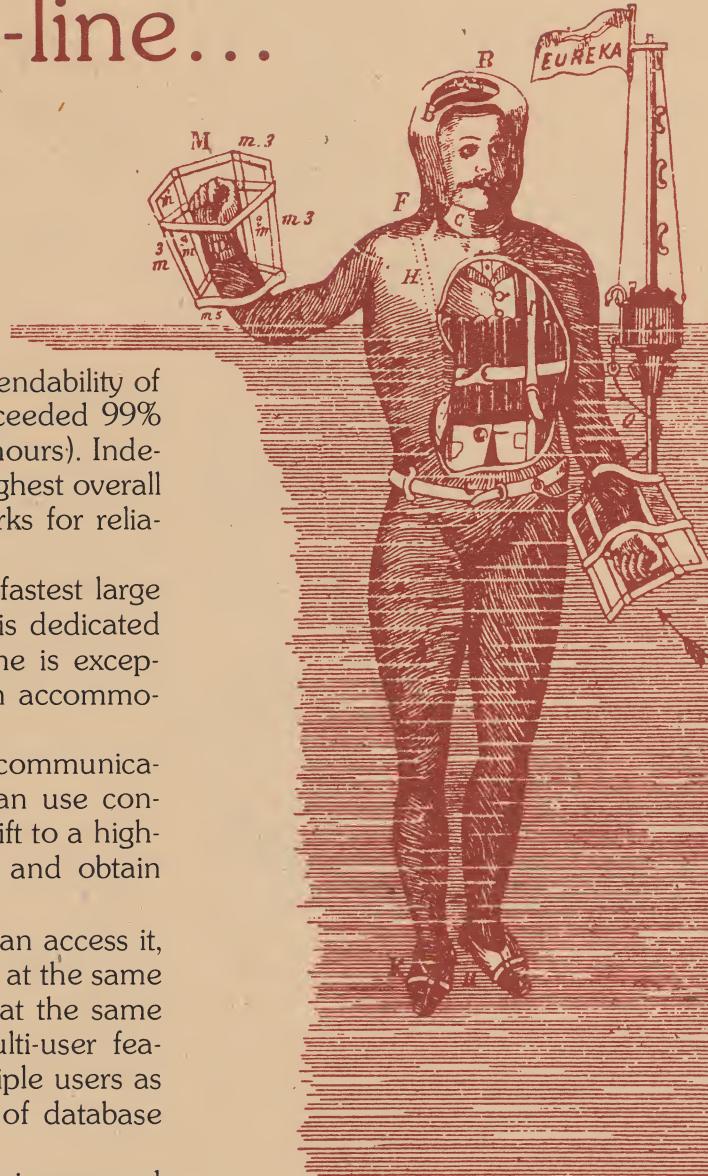
One reason our business has grown so fast is the dependability of our service. On a 12-month average basis, up-time has exceeded 99% of scheduled service time (99.4% during normal business hours). Independent surveys of time sharing users have produced the highest overall rating for Scientific Time Sharing, with especially high marks for reliability.

Our powerful fourth-generation Amdahl 470V/6, the fastest large capacity general purpose business computer in the world, is dedicated exclusively to providing APL*PLUS Service. Response time is exceptional, and with billions of bytes of on-line storage, we can accommodate your largest database.

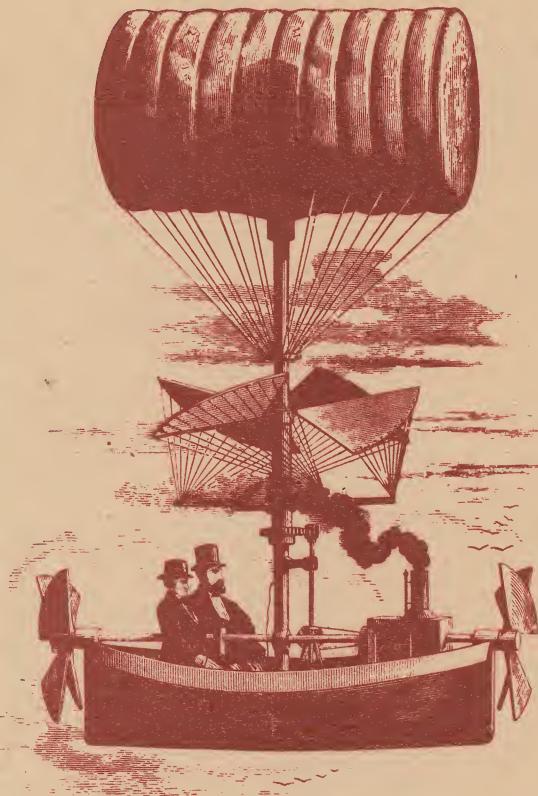
Users access the Amdahl 470 via our nationwide telecommunications network seven days a week, 20 hours a day. You can use convenient interactive terminals for most work. And you can shift to a high-speed terminal to transmit voluminous amounts of data and obtain lengthy reports on a line printer in your office.

Who can access your data, and how each individual can access it, is under your absolute control. You can work with many files at the same time. Many users, anywhere, can work with the same files at the same time. Other database management systems also have multi-user features, but do they provide for simultaneous update by multiple users as in the APL*PLUS System? This most sophisticated form of database sharing is crucial for many large-scale on-line applications.

Files are ideal for small jobs too. Casual, impromptu use is easy and immediate. Your files are automatically kept private unless you allow access by other users. Regardless of the size of your file, its privacy and integrity are protected by rigorous security measures.



Problem solving with APL*PLUS Service... is no problem at all!



Problem solving is what APL*PLUS Service is all about. A management tool . . . whether it be for financial analysis and planning, corporate models, accounting, information retrieval, database management, market research, sales forecasting, inventory management, engineering, simulation, mathematical analysis or a host of other problem areas. APL*PLUS Service is for serious applications.

EXISTING PACKAGES FOR EXISTING PROBLEMS

It's quite possible that we have already developed an application package directed to your particular problem.

AMONG THE PROPRIETARY PACKAGES WE OFFER "OFF THE SHELF" ARE . . .

ACT*PLUS, Actuarial Language

ADDRESS, Address List Management

CUPAK, General Ledger Accrual Accounting System

FINANCEPAK, Financial Functions Library

FPS, Financial Planning System

MAILBOX, Electronic Communications

MARTHA, Electrical Circuit Analysis (developed by MIT)

NETWORK PLANNING, Communications Network Design and Planning Package

PASS, Personnel Assignment and Scheduling System

PERT*PLUS, Project Control System

PLOT, Graphic Display

PORTMANAGE, Securities Management System

SECURITIES DATA BASE, Comprehensive Listings of All Major Exchanges

707, Materials Management Simulation

747, Forecasting and Inventory Management, including Multiware-housing

SIMS, Shared Information Management System

STATPAK, Mathematical Solutions

Are these "canned" programs designed for a fixed application and difficult to modify to suit your needs? No. They can be used stand-alone, and they can also be adapted to meet your unique needs.

Our Catalog describes these and hundreds of other programs that you might find useful in your business.

"TURNKEY" INSTALLATIONS

Perhaps you have an application need, but no one right now to devote to its development. Scientific Time Sharing will take full responsibility for developing and maintaining a complete tailored application. Our professionals are experienced in the programming aids we've developed and in many specialized applications. They bring with them this giant toolbox, a readiness to apply it to your business, and a willingness to find new solutions to new problems.

Training, service, special assistance... at your place or ours.

We want our customers not only to use APL*PLUS but to use it well. So we're eager to provide training, service, and special assistance. Over 80% of our staff are professionals, many with advanced degrees. Each of these professionals, like a craftsman, enjoys working with good tools, and each is dedicated to our concept of total service.

Training. Start by sending your best "craftsmen" to our three-day course. We use closed-circuit TV, on-line terminals, and personal instruction refined through the experience obtained in teaching APL to thousands of people. The textbook that is used grew out of such courses taught by our Technical Director and has become the most widely used APL text in the world. The course is also recommended for top managers and other professionals who need to be aware of APL's capabilities.

As a follow-up to the programming course, we give personalized assistance in systems design and review the user's programs to make suggestions on programming techniques. And after your craftsmen become experienced, they may want to attend our popular one-day course in advanced techniques.

Additional courses run the gamut from a one-day course in the use of terminals for non-programmers to a number of in-depth seminars in specialized applications, such as financial planning.

Service. Our marketing representatives are chosen for their ability to develop application systems. Your representative stays with you, working with you regularly, ready to roll up his or her sleeves when needed. Customers tell us it's refreshing to talk to a "salesman" who thinks the best way to sell is to solve a customer's problem. If it's as simple as we say, why not try it on one of your problems?



Special Assistance. The special programming assistance you require is provided by your local representative and applications development experts. This team is further supported in their efforts on your behalf by a group of APL*PLUS experts in our Headquarters.

But that isn't all. We also support you with professionals from various disciplines, located throughout the country and highly mobile, to give you quick and thorough help when needed. For minor problems that require instant solutions, you may want to contact them through the Mailbox, our instantaneous communications facility.

The Mailbox is also a cost-effective way for you to communicate among offices in your own company to advise users of program changes, report financial results, place orders, and so forth. Independent consultants outside Scientific Time Sharing use the Mailbox for fast, responsive service to their clients. If you have a communications gap, Mailbox might be the answer. We can't describe it here. You'll have to see it in operation.

The APL*PLUS communications network stretches throughout the United States and Canada. It's growing... and it can be yours.

Do you do business in more than one city?

Distances shrink, along with telephone and travel costs, when your programs and data are as up-to-date in one city as another. Actually the programs and data are in one place. But every location has them . . . with a local phone call. At different times—or simultaneously. And you have control.

APL*PLUS Service is as convenient in Kalamazoo, Salt Lake City, and Woodland Hills as in New York, Chicago and Los Angeles. In fact, you can reach us with a local phone call in these cities:

ALABAMA: Entire State. ARIZONA: Phoenix. CALIFORNIA: Century City, Cupertino, El Segundo, Garden Grove, Long Beach, Los Angeles, Marina del Rey, Menlo Park, Mountain View, Newport Beach, Oakland, Oxnard, Palo Alto, Riverside, Sacramento, San Carlos, San Diego, San Francisco, San Jose, San Pedro, Santa Ana, Santa Barbara, Saticoy, Sunnyvale, Ventura, Woodland Hills. COLORADO: Denver. CONNECTICUT: Darien, Hartford, New Haven, Stamford. DC: Washington area. DELAWARE: Entire State. FLORIDA: Entire State. GEORGIA: Atlanta. HAWAII: Honolulu. IOWA: Des Moines. ILLINOIS: Chicago, Freeport. INDIANA: Indianapolis. KANSAS: Wichita. KENTUCKY: Entire State. LOUISIANA: Baton Rouge, New Orleans. MASSACHUSETTS: Boston, Cambridge, Springfield. MARYLAND: Baltimore, Silver Spring. MICHIGAN: Ann Arbor, Detroit, Kalamazoo. MINNESOTA: Minneapolis. MISSISSIPPI: Entire State. MISSOURI: Kansas City, St. Louis. NEW JERSEY: Englewood Cliffs, Morestown, Newark, Union, Wayne. NEW YORK: Buffalo, New York, Rochester, Syracuse, White Plains, Area Codes 315, 518, 607, 716. NORTH CAROLINA: Entire State. OHIO: Entire State. OKLAHOMA: Oklahoma City. OREGON: Portland. PENNSYLVANIA: Philadelphia, Pittsburgh, Valley Forge. SOUTH CAROLINA: Entire State. TEXAS: Dallas, El Paso, Houston, Midland, San Antonio. UTAH: Salt Lake City. VIRGINIA: Entire State. WASHINGTON: Seattle. WEST VIRGINIA: Entire State. WISCONSIN: Madison, Milwaukee. CANADA: Calgary, Edmonton, Montreal, Ottawa, Toronto, Vancouver.

If your city is not listed above, please ask for our latest list. If it's not on that, talk to us—maybe it should be.



Eighteen offices, and over 100 access locations serve you...

CORPORATE HEADQUARTERS:

Scientific Time Sharing Corporation

7316 Wisconsin Avenue
Bethesda, Maryland 20014
(301) 657-8220

OTHER SCIENTIFIC TIME SHARING CORPORATION OFFICES:

Boston

462 Boylston Street, Suite 305
Boston, Massachusetts 02116
(617) 267-6864

Chicago

10400 West Higgins Road, Suite 300
Rosemont, Illinois 60018
(312) 297-2220

Dallas

2201 Smith-Barry Road, Suite 109
Arlington, Texas 76013

Ft. Lauderdale

4909 Banyan Lane
Tamarac, Florida 33319
(305) 739-0555

Hartford

18 Asylum Street, Suite 206
Hartford, Connecticut 06103
(203) 549-0107

Houston

7000 North Freeway, Suite 700
Houston, Texas 77022
(713) 691-6319

Los Angeles

21243 Ventura Blvd., Suite 240
Woodland Hills, California 91364
(213) 340-4611

17291 Irvine Blvd., Suite 153
Tustin, California 92680
(714) 731-0541

298 S. Seaward, Suite D
Ventura, California 93003
(805) 648-7968

New York

747 Third Avenue
New York, New York 10017
(212) 751-9305

Philadelphia

P.O. Box 308
Willingboro, New Jersey 08046
(609) 877-4610

Pittsburgh

P.O. Box 145
Monroeville, Pennsylvania 15146
(412) 372-6013

Salt Lake City

University Club Building
136 E. South Temple Street
Salt Lake City, Utah 84111
(801) 364-5892

San Francisco

580 Washington Street, Suite 202
San Francisco, California 94111
(415) 391-6194

530 Oak Grove Road, Suite 102
Menlo Park, California 94025
(415) 326-8300

Washington, D.C.

4733 Bethesda Avenue, Suite 800
Bethesda, Maryland 20014
(301) 986-1750

White Plains

7 Holland Avenue
White Plains, New York 10603
(914) 428-6910

SCIENTIFIC TIME SHARING CORPORATION

“Our business is business—
our approach is scientific.”

SCIENTIFIC TIME SHARING CORPORATION

7316 Wisconsin Avenue
Bethesda, Maryland 20014 USA
301-657-8220

WORLD LEADER IN APL

SCIENTIFIC TIME SHARING CORPORATION

7316 Wisconsin Avenue, Bethesda, Maryland 20014

Telephone: (301) 657-8220

APL PLUS® SERVICE

PUBLICATION ORDER FORM

JULY 1978

Pub. No.	Description	Price	Qty.	Total
----------	-------------	-------	------	-------

EXTERNAL APL PUBLICATIONS

XP005	APL: An Interactive Approach , L. Gilman and A. J. Rose, John Wiley & Sons, Inc., 1976, 378 pp. More people learn APL from this text than any other. Standard text for STSC introductory courses.	\$12.00	_____	_____
XP016	Introduction to APL and Computer Programming , E. A. Harms and M. P. Zabinski, John Wiley & Sons, Inc., 1977, 400 pp. Introduces the APL language and presents seven case studies showing practical APL applications. Discusses programming errors and interactive debugging for the beginning programmer.	11.00	_____	_____
XP007	APL\360 Primer, A Student Text , P. C. Berry, IBM Corporation, 1970, 241 pp. Concepts and examples of the APL language and the APL\360 System for the beginning programmer.	9.00	_____	_____
XP006	APL 360 Reference Manual , S. Pakin, Science Research Associates, Inc., 1972, 192 pp. A reference manual widely used by APL programmers.	5.00	_____	_____
XP008	APL Language , IBM Corporation, IBM Form No. GC26-3847, March 1975, 94 pp. An overall reference for any IBM APL system at the language level, as well as an introduction to APL for those unfamiliar with it.	3.00	_____	_____
XP010	Elementary Analysis , K. E. Iverson, APL Press, 1976, 218 pp. Uses APL as the notational vehicle for a senior high school level course in Introductory Analysis or elementary functions (pre-calculus).	6.25	_____	_____
XP011	APL in Exposition , K. E. Iverson, APL Press, 1976, 61 pp. A source book for ideas and demonstratives on a wide range of topics. Includes a very motivating section dealing with fundamentals of computers and computing.	2.50 (set)	_____	_____
XP012	Introducing APL to Teachers , K. E. Iverson, APL Press, 1976, 29 pp. Stresses experimentation with an APL terminal to learn and teach representative mathematical concepts at the high school level.			
XP013	An Introduction to APL for Scientists and Engineers , K. E. Iverson, APL Press, 1976, 26 pp. Guided experimentation for those with some knowledge of vector algebra. Includes examples of proofs and identities in APL.			
XP019	Materials Management Systems: A Modular Library , R. G. Brown, Wiley Interscience, 1977, 436 pp. Covers theoretical aspects and system design considerations in forecasting, inventory management, production planning and scheduling, shop floor control, and physical distribution.	23.00	_____	_____
XP001	Management Problem-Solving with APL , J. W. Buckley, M. R. Nagaraj, D. L. Sharp, and J. W. Schenck, Melville Publishing Company, 1974, 367 pp. A guide to the solution of typical accounting, financial, and managerial problems through APL time sharing.	11.50	_____	_____
XP009	Techniques of Financial Analysis , E. A. Helfert, R. D. Irwin, Inc., 1972, 270 pp. A concise reference and guide to the more important techniques and tools used in financial analysis.	7.00	_____	_____
XP014	NBER Time Series Data Bank , National Bureau of Economic Research, September 1977, 169 pp. Directory of code names for more than 3300 time series contained in an online database supplied by the National Bureau of Economic Research. Includes supplement containing updates through September 1977.	5.00	_____	_____
XP015	APL Econometric Planning Language (EPLAN): Program Description and Operations Manual , IBM Corporation, IBM Form No. SH20-1620, June 1976, 74 pp. Describes the functional capabilities of the APL EPLAN program, an interactive APL-based language for econometric modeling and forecasting.	6.50	_____	_____
XP018	X-11: Information for the User , U. S. Bureau of the Census, 1969, 89 pp. A brief history and introduction to the Census Bureau Seasonal Adjustment program and its culmination in X-11.	3.00	_____	_____

XP017	The X-11 Variant of the Census Method II Seasonal Adjustment Program , U. S. Bureau of the Census, Technical Paper No. 15, J. Shiskin, A. H. Young, and J. C. Musgrave, U. S. Government Printing Office, 1967, 66 pp.	2.00	_____
	Describes the X-11 version of the U. S. Bureau of the Census Method II for decomposing economic time series into three components: seasonal factors, trend and cyclical fluctuations, and irregular fluctuations.		
XP003	Algebra: An Algorithmic Treatment , K. E. Iverson, Addison-Wesley Publishing Company, Inc., 1972, 360 pp.	9.50	_____
	Employs APL both as a language and as a practical tool in presenting topics in a second course in algebra.		
XP004	Martha User's Manual and Addendum , P. Penfield, Jr., The MIT Press, 1971, 1973, 220 pp.	11.00	_____
	Describes the use of programs in the Martha linear circuit analysis system.		
MAJOR APL*PLUS SERVICE PUBLICATIONS			
P010	APL*PLUS Service Catalog , D. Trost, STSC, 1977, 83 pp.	N/C	Limit 2 per customer
	Lists the contents of the APL*PLUS Common Libraries. Categorizes and describes application packages, manuals, databases, libraries, workspaces, groups, functions, and variables.		
P009	A User's Guide to Enhancements in the APL*PLUS System , STSC, 1977, 196 pp.	10.00	_____
	Describes major enhancements in the APL*PLUS System, including system primitives, system functions and variables, improved system response and terminal behavior, and new and changed system commands. Further enhancements are described in the following free supplements: No. 1:)EDIT and)XLOAD System Commands, and Other APL*PLUS System Enhancements. No. 2:)SS and)TERMINAL.		
P011	APL*PLUS Address Management Package User's Guide , P. J. Ravitz, STSC, 1973, 26 pp.	3.00	_____
	Describes the use of programs for entering, modifying, and retrieving name and address information. Latest features are described in these free supplements: No. 1: Enhancements to Address Package. No. 2: Address Labels.		
P029	APL*PLUS Comprehensive Manufacturing Control System (CMCS) User's Guide , Preliminary Documentation, STSC, 386 pp.	25.00	_____
	Documentation on a complete library of over 150 program modules for forecasting, inventory management, production planning and scheduling, shop floor control, and physical distribution.		
P018	APL*PLUS CUPAK: General Ledger Accounting System for Federal Credit Unions User's Guide , C. A. Ryniker, STSC, 1974, 92 pp.	10.00	_____
	Comprehensive instructions for using CUPAK, an Accounting System for credit unions for maintaining their Journal and Cash Records and General Ledgers, and producing financial statements.		
P022	APL*PLUS CUPLOT: A Supplement to CUPAK , C. A. Ryniker, STSC, 1976, 30 pp.	3.00	_____
	A user's guide to the CUPLOT programs for producing plots and tables of data in the CUPAK General Ledger and historical file.		
P028	APL*PLUS EMMA (Extended Management Macros in APL) User's Guide , R. A. Sykes, Jr., STSC, 1977, 41 pp.	5.00	_____
	Careful organization, detailed explanations, and many examples make this the basic guide to using EMMA files for the management of large amounts of data.		
P030	APL*PLUS EMMA Reference Manual , R. R. DeCloss, STSC, 1978, 250 pp.	20.00	_____
	Provides summaries and technical details on the logical structure of all EMMA files and utility functions. (This reference manual is STSC licensed documentation and is distributed only to customers of APL*PLUS Service who execute a license agreement.)		
P020	APL*PLUS File Sort Facility User's Guide , R. J. Beilstein, STSC, 1975, 32 pp.	3.00	_____
	A complete user's guide to the File Sort Facility, an efficient means of sorting large volumes of data contained in APL*PLUS System files.		
P013	APL*PLUS File Subsystem Instruction Manual , L. M. Breed, STSC, 1971, 61 pp.	3.00	_____
	Covers the facilities needed for working with large data files using the APL*PLUS File Subsystem.		
P006	APL*PLUS FINANCEPAK III User's Guide , R. M. Oliver, STSC, 1975, 52 pp.	5.00	_____
	Describes stand-alone programs for calculating internal rates of return, interest rates, discount factors, yields, depreciation deductions, loan payment and bond schedules, discounted cash flows, and financial dates.		
P031	APL*PLUS Financial Planning System (FPS) User's Guide – Part 1 , Second edition, STSC, 1977, 26 pp.	2.00	_____
	Part 1 presents an overview of corporate financial planning and modeling procedures and contains examples illuminating their use.		

P032	APL*PLUS Financial Planning System (FPS) User's Guide – Part 2 , STSC, 1978, 385 pp. Describes programs and procedures used throughout the system to write model programs, store inputs, define and produce reports and plots, create and manage databases, and consolidate databases. (Part 2 is STSC licensed documentation and is distributed only to customers of APL*PLUS Service who execute a license agreement.)	35.00	_____
F	APL*PLUS Formatting User's Guide , N. Dyer, STSC, 1977, 60 pp. Describes both system formatting conventions and functions for explicit formatting (the monadic and dyadic format primitives and the system function □FMT).	5.00	_____
P002	APL*PLUS FULLTEXT User's Guide , A. J. Rose, STSC, 1973, 11 pp. Provides instructions for using FULLTEXT for the storage, rapid retrieval, and display of documents.	2.00	_____
P014	APL*PLUS Interactive Project Management System (PERT*PLUS) User's Guide , B. H. Stowens, STSC, 1974, 93 pp. Describes the procedures available in the PERT*PLUS System for applying PERT critical path methodology to network analysis and manpower requirements.	10.00	_____
P017	APL*PLUS Message Processing System (MAILBOX) User's Guide , STSC, 1975, 48 pp. Provides detailed instructions and examples for sending and receiving messages in the MAILBOX System.	5.00	_____
P012	APL*PLUS PLOT Instruction Manual , A. J. Rose, STSC, 1972, 21 pp. Describes the types of plots and options available in the APL*PLUS PLOT facility.	2.00	_____
P025	APL*PLUS Quick Planning System (QUICKPLAN) User's Guide and Reference Manual , STSC, 1977, 156 pp. Shows the user how a powerful set of reporting, computational, and database management programs can be used to plan and produce business reports.	10.00	_____
P004	APL*PLUS Shared Information Management System (SIMS) User's Guide , E. A. Robie, STSC, 1973, 58 pp. Explains the use of the programs in the SIMS general purpose data management system.	5.00	_____
P015	APL*PLUS Use and Misuse of APL — Efficient Coding Techniques , R. A. Sykes, Jr., STSC, 1973, 22 pp. Some observations on techniques for improving the efficiency of user-written programs.	3.00	_____
F 3	APL*PLUS Workspace Documentation Package (WSDOC) User's Guide , R. A. Smith, STSC, 1975, 25 pp. Provides instructions for obtaining a formatted listing of the entire contents of a workspace.	3.00	_____

APL*PLUS SERVICE WORKING MEMORANDA

W103	ACT*PLUS — An Extended Actuarial Programming Language , D. G. Halmstad, STSC, 1974, 37 pp. Describes the ACT*PLUS functions for making actuarial calculations quickly and efficiently and using the extensive set of tables provided in the system.	5.00	_____
W105	APL-ASCII: An ASCII Overlay Standard , L. M. Breed, STSC, 1972, Revised 1974, 7 pp. A widely accepted standard for APL characters on ASCII terminals. APL-ASCII keyboard displays and transmission code charts are included.	N/C	Limit 2 per customer
W101	APL*PLUS CONTOUR Package , R. J. Korsan, STSC, 1974, 10 pp. A guide for using workspace 10 CONTOUR to produce three-dimensional contour charts.	2.00	_____
W120	APL*PLUS Electronic Circuit Design and Analysis Programs , W. B. Lurie, STSC, 1977, 36 pp. Describes three groups of application-oriented programs used in the specialized electronics field of frequency-selective network design.	3.00	_____
W108	APL*PLUS Function Editing Program: FNED , J. M. Spencer and C. E. Yates, STSC, 1975, 22 pp. Details the use of the function editor FNED in workspace 11 FNED.	2.00	_____
W112	APL*PLUS Function Line Editing Program: FLE , J. M. Spencer and C. E. Yates, STSC, 1975, 8 pp. Explains the use of the program FLE in workspace 11 FLE for editing single lines of a function.	2.00	_____
W109	APL*PLUS MATHPAK Manual , STSC, 1969, 25 pp. Explains the use of functions in Library 20 for solving scientific and engineering problems.	2.00	_____

W110	APL*PLUS STATPAK User's Guide , STSC, 1975, 47 pp. Describes the STATPAK functions for performing calculations in statistical analysis and mathematical programming and gives examples of their use.	3.00	_____
W106	Boolean Functions and Techniques , R. A. Smith, STSC, 1975, 22 pp. A collection of notes and tables from an STSC Special Topics Seminar on the use of Boolean functions and techniques in APL.	2.00	_____
W117	Computer Usage Data System User's Guide , J. R. Becker, STSC, 1976, 41 pp. Outlines a system to permit users to access, store, and generate reports of detailed usage data.	3.00	_____
W111	Deferred Execution User's Guide , P. O'Donnell, STSC, 1975, 3 pp. Shows users how to extend productivity and take advantage of a reduced CRU rate for running lower priority jobs.	1.00	_____
W116	Design of an Execute Primitive Function for the APL*PLUS System , T. H. Puckett, STSC, 1976, 8 pp. Design considerations for the execute primitive function implemented on the APL*PLUS System.	2.00	_____
W114	Guidelines for Good APL Programming Style , D. A. Link, STSC, 1975, 10 pp. Some recommended techniques to use in writing readable APL programs.	2.00	_____
W104	High-Speed Data Terminal User's Guide , J. J. Prats, STSC, 1974, Revised 1978, 17 pp. Provides user instructions and commands for using a high-speed data terminal at remote locations to enter punched card or magnetic tape data into APL*PLUS System files and to receive reports or punched card or magnetic tape output from APL*PLUS System files.	2.00	_____
W125	Source Level Transfer Using the Workspace Interchange Standard , J. G. Wheeler, STSC, 1978, 44 pp. Provides step-by-step procedures for transferring workspaces and files to and from the APL*PLUS System.	3.00	_____
W115	Standard Industrial Classification (SIC) Codes and Titles , STSC, 1975, 14 pp. Describes the SIC code database and the functions used to access it.	2.00	_____
W121	Workspace Conservation: Chained Variables , STSC, 1977, 5 pp. Explains an automatic mechanism that avoids many workspace full conditions on calls to user-defined functions in the APL*PLUS System.	2.00	_____
W118	Writing Interactive APL Programs: A Discussion of Techniques , M. A. Zimelis, STSC, 1976, 24 pp. An overview of interactive APL programming techniques.	3.00	_____

APL*PLUS SERVICE REFERENCE CARDS

H011	APL*PLUS Service Phones and Sign-on Reference Booklet , STSC, June 1978. Contains telephone numbers and sign-on procedures for access to the APL*PLUS Time Sharing Service.	N/C	Limit 10 per customer
H007	APL*PLUS Service Reference Card , STSC, 1971. A summary of primitive functions, system commands, file functions, special symbols, and other valuable information in the APL*PLUS System.	N/C	Limit 10 per customer
H002	APL*PLUS File Subsystem Summary Sheet , STSC, 1976. A quick reference summary of all file operations in the APL*PLUS File Subsystem.	N/C	Limit 10 per customer
H014	APL*PLUS Comprehensive Manufacturing Control System (CMCS) Reference Card , STSC, August 1977. A handy listing of CMCS capabilities including utility functions, workspaces, file retrieval parameters, and variables.	N/C	Limit 10 per customer
H016	APL*PLUS System Functions Summary , STSC, June 1978. A quick reference of APL*PLUS System functions including syntax, arguments and result, and summary of use for each.	N/C	Limit 10 per customer

Total of Page 4

\$

**FIRST CLASS
MAIL**

PERMIT No. 38986
Washington, D. C.

BUSINESS REPLY MAIL

No Postage Required If Mailed In U.S.A.

Postage Will Be Paid By —

SCIENTIFIC TIME SHARING CORPORATION
7316 WISCONSIN AVENUE
BETHESDA, MARYLAND 20014

Total of Page 1 \$ _____

Total of Page 2 _____

Total of Page 3 _____

Total of Page 4 _____

Subtotal _____

Local tax (if any) _____

Shipping _____

TOTAL \$ _____

Please Ship Via: _____

Payment Enclosed Please Bill Me — P.O. No. _____

Name _____ Title _____

Company _____

Address _____ City _____ State _____ Zip _____

Signed _____ Date _____

H013-0778

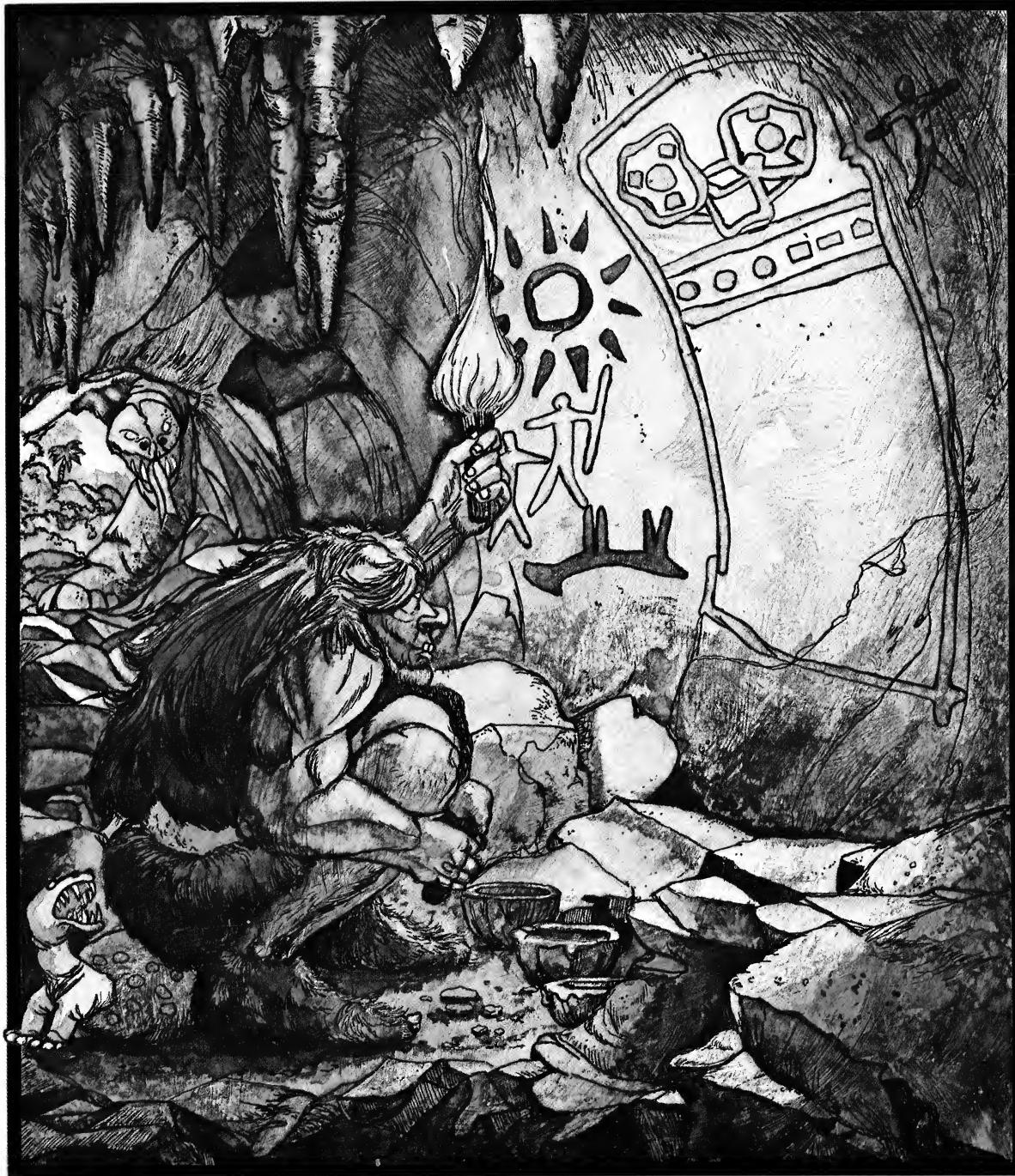
JANUARY 1977

Computer Decisions

Computer Decisions

A HAYDEN PUBLICATION®

DISTRIBUTED COMPUTING FOR MANAGEMENT



Ernest T. Jarry

GOVERNMENT / Carter and the industry: Why not the best? / Becky Barna
We've just elected the first president who seems to appreciate computers. Will he be good for us?

Carter and the industry: Why not the best?

We've just elected the first president who seems to appreciate computers. Will he be good for us?

With the roar of engines and the purr of a computer, *Peanut One* whisked Jimmy Carter around the country in his quest for the highest office in the land. While the high-speed campaign jet crisscrossed the country with candidate Carter, a high-powered computer methodically communicated his messages to campaign headquarters, the press office and running mate Walter Mondale.

The computer is no stranger to Jimmy Carter. An ardent advocate of economy and efficiency in government, Carter long ago found the computer a clever companion in implementing cost-cutting schemes. While Governor of Georgia, Carter clung to the computer for help in eliminating duplicative departments, agencies and services in the state's then convoluted structure.

But in his successful drive for the Presidency, Carter and the computer became even closer allies. With the computer, Carter said, "we are witnessing a major change in executive communications."

Mailbox mastermind

Jimmy Carter was referring to a sophisticated electronic communications system that was helping him run the race. Mastermind of the project was John McCann of Scientific Time Sharing Corporation, an *APL* house headquartered in Bethesda, MD. Called *Mailbox*, the system served as a major communications link between the members of the geographically dispersed Democratic campaign team.

McCann dreamed up the computer connection for Carter shortly



after joining STSC last May as director of corporate communications. Having helped out in the preliminary organization of the Muskie campaign four years earlier, the 20-year veteran of the computer industry saw electronic communications as a real boon to politicians. And he decided the Carter camp would be amenable to the idea.

McCann approached several STSC salesmen with the plan, but no one was particularly enthusiastic. None of the sales force had contacts with the Carter campaign staff, and each recognized that the account would be

a short-term one, and relatively small at that. So, McCann says, "they decided I was the one to pursue it."

That suited the aggressive exec just fine. Although he too lacked ties to the Carter camp, McCann didn't let that deter him. From press accounts he picked out the name of Dr. Peter Bourne as being one of Carter's main men, and fired off a letter to him describing his computer concoctions for Carter. The letter set things in motion. Bourne forwarded McCann's proposal to Stephen Slade, chief systems analyst on the campaign staff, who then issued McCann a coveted invitation to Atlanta.

Applications abound

When McCann arrived at campaign headquarters, he found that the Carter camp's computer applications were already abundant. Computerized cost controls and an electronic delegate analysis system were whirring away. A computerized scheduling system was spitting out campaign priorities. Terminals were dialing in for data from the *New York Times* Information Bank. And computer printouts were pointing out the latest polling data from Democratic pollster Pat Cadell in Cambridge, MA.

McCann was impressed with how effectively the campaign was tied in with the computer. He was also impressed with Carter's selection of competent computer specialists. Apparently they were impressed with McCann as well. Within two weeks after his trek to Atlanta, McCann had a contract in hand for one computer application the Carter camp

Remember Anaheim?

It was May 1975. Members of the computer community had congregated in Anaheim, CA for the annual National Computer Conference, sponsored by the American Federation of Information Processing Societies. Reporters were filing into the press room following the morning's technical sessions. The big question for many of them was whether to take in the luncheon address or split for an hour's respite at Disneyland.

"What words of wisdom does he have for us?"

"The program touts his topic as 'Why Not the Best?' Sounds heavy duty, huh?"

"Yeah. Really far out. I'm gonna climb the plastic Matterhorn. See you suckers around."

And that's how the press, with its usual wisdom and foresight, missed an important and perhaps prophetic speech. Even those reporters who stayed, out of courtesy or exhaustion from the previous night's dissipation, took no notes, clapping perfunctorily at the conclusion of the former Governor's address.

The NCC's organizers apparently knew something the wiseacre press people didn't, or maybe they were just lucky. Either way, it was smoother and quieter than the time that then-Vice President Gerald Ford was almost poisoned with LSD at the '74 NCC show in Chicago.

You can be sure the Disneyland delinquents of the '75 NCC are kicking themselves for not getting a front-page story on "Carter: the Computer Candidate." Other attendees of the '75 conference are now assuming an air of self-importance for having "met" Jimmy Carter long before most Americans had even heard his name.

Tom White, AFIPS director of communications, looks back on his brief encounter with Carter with both relish and remorse. "I still think with pleasure about those five minutes I spent chatting with Carter before his press conference", which followed the luncheon address.

But what White remembers even more vividly is the hassle of having to herd more than half of the AFIPS Steering Committee into the press conference room "just so we'd have warm bodies there." It was embarrassing even then, he recalls. "There just wasn't much press enthusiasm over Carter."

It was Donal Meier, conference chairman for '75 NCC, who invited Carter to speak at the event. The invitation was extended not because Carter was planning to run for President, but because Meier had been impressed with the Georgia Governor's previous speaking stints before other computer groups. He had heard Carter issue his official challenge — "Why Not the Best?" — before the '73 meeting of the Association for Computing Machinery and the '74 convention of the American Society for Information Science.

"Jimmy Carter is no stranger to what the computer can do for him," Meier said in introducing him to the NCC crowd. "The application of computers throughout the state of Georgia is something other states are trying to emulate."

Carter flashed the now-familiar grin. "First of all, let me say that I am pleased to meet with you. . ." That Southern drawl was striking. "This is a time in the evolution of our nation and the world when there's a searching for the proper interrelationship between scientists on the one hand and other decision-makers, particularly political figures, on the other."

What Carter told the NCC crowd he had accomplished while Governor of Georgia now sounds quite similar to his Presidential campaign promises of the past year. "When I was elected Governor of Georgia about five years ago, we had nearly 300 different agencies and departments in the government. We abolished 278 of them. . .We initiated a new budgeting technique for the first time in the world called 'zero based budgeting' . . . Every major department in our state government had its own computer system. Now we have one computer system."

But Carter didn't take all the credit for the changes in Georgia's government. He explained that there had been a time in the past when all major projections for the future were made by politicians, and the details were filled in by scientists. But in our modern technological world, Carter said, that circumstance has

SPECIAL ADDRESS



The Honorable Jimmy Carter
Former Governor of Georgia
Wednesday, May 21, 1975
1:00 p.m., Anaheim Room
Anaheim Convention Center

The Honorable Jimmy Carter, former Governor of Georgia, will deliver a major address on May 21 beginning at 1:00 p.m. in the Anaheim Room at the Anaheim Convention Center.

A technologist by initial training, Jimmy Carter has given serious thought and study as to how science and technology might be best tapped and utilized to serve the public good, including effective development and utilization of information processing as a national resource.

During 1973-74, he served as National Campaign Chairman for the Democratic Party. Recently, Jimmy Carter announced his candidacy for his party's Presidential nomination in 1976.

Elected Governor of Georgia in 1970, his tenure in the House was an active one and included significant

Jimmy Carter is

drastically changed. As he told the computer community, "There is no way for the most brilliant political manager or elected official to make a proper judgment about the future without the intimate involvement of competent specialists like you."

Not once during the half-hour address did Carter mention his highest political aspirations. It wasn't until the question-and-answer session which followed that Carter made his startling announcement.

"Mr. Carter," commented an NCC attendee, "I agree with your ideas about the need for interaction between the scientific and political communities. Can you recommend a process, such as lobbying or a group similar to Common Cause, whereby the data industry can have a more effective voice in government?"

Jimmy Carter paused for a moment's deliberation, and then decisively stated, "Well, I don't think anybody's mentioned it yet, but I'm running for President myself." The crowd cheered, and Carter chortled. "I didn't say that to ask for your support, although I would welcome it."

Governor Carter's response to the query in May 1975 provides insight into what President Carter will guard against in his quest for the scientific community's contribution to the political processes. "First of all," he said, "the initiative for scientific and professional and business involvement in government almost always has to come from the elected public officials themselves." He noted the difficulty of getting the business community to break away from offering "strictly selfish" services to elected public officials. According to Carter, lobbying is another problem. "When lobbyists come into the capital halls," he stated, "they almost inherently are much more selfish than the constituent groups that pay them."

Carter added that he would like to see some changes. "I think it would be a great thing if your own group would take a particular facet of public concern and work on it. Then you could go to the appropriate officials and say, 'This is something we have analyzed and these are the alternatives.' It would be a great and very good and proper thing to do for the business or professional or scientific community to take the initiative." □

had yet to implement — an electronic executive communications and message distribution system. It was STSC's *Mailbox*.

The system was soon operational. Powered by a big Amdahl 470 computer at STSC's Bethesda headquarters, it comprised a series of mailboxes assigned to Carter, Mondale and various other individuals and groups within the campaign staff. Toting portable terminals, Carter and Mondale were able to keep track of each other's frenetic schedules. Moreover, each was able to keep tabs on the other's public statements and positions to avoid catastrophic contradictions.

Tie that binds

Mailbox soon became the tie to bind the other computer applications that were already humming away in the political machine. If Mondale had an idea on tax reform, for instance, he would transmit it through *Mailbox* to Stuart Eisenstat in the issues room. Eisenstat would take a look at it, see if additional data was needed from the *New York Times* data bank, and then send the combination package to Carter.

Even while airborne, Carter was constantly feeding messages to his mailbox. The jet wasn't connected to the system by radio hook-up, but magnetic tape devices were on board so typists could continue to capture data. Once *Peanut One* touched down, the telephone company would rush in with five pairs of communications lines, and the system would again start purring.

"One of the problems" McCann says, "is that they often weren't on the ground long enough to obtain all the information they wanted before they had to disconnect and get airborne again. They were using 30 character-per-second terminals and they really could have used a 1200 baud system." But McCann and STSC entered the Carter camp too late to convince them they needed a higher speed system.

Nonpartisan pitch

John McCann was not partisan in his pitch to the Presidential nominees for the *Mailbox* application. Once he had clinched the contract with the Carter clan, McCann set out to try a similar tack with Gerald Ford's people. His scheme wasn't as well

received at the Ford White House. "A spokeswoman for Ford told me, 'We got all our communications capacity from the Air Force,'" McCann recalls. "I couldn't argue with that attitude."

Mailbox was operational until the day the Carter campaign turned into the Carter celebration. It hasn't been used since, but McCann hopes that situation will soon change. "Now I'm negotiating with Jody Powell [Carter's press secretary] for what I call an electronic press office," McCann divulges. "And I have a whole flock of other applications I'm trying to put into the White House."

Among that "flock" is what McCann calls the Carter Public Statement Data Base. The application is a combination of the *Mailbox* system with a text database of speeches, news releases and other pertinent Presidential communications. As McCann envisions it, President Carter's own press office and speechwriting group, as well as the general press, could use terminals to communicate with individuals or groups that are part of *Mailbox* to extract historical information. By punching a few keys, *Mailbox* members could retrieve everything Carter has ever said about a given subject, when and where it was said, and what his position was.

And the time to implement the system is now, McCann asserts, while the amount of historical data to be coded and entered is still relatively small. The STSC exec says he is "pursuing this hot and heavy," but a careful probe of his plans indicates that he's actually proceeding with great caution.

For one thing, his first in with the Carter team came through the campaign staff. "Now they're operating with an entirely different group of people," McCann observes. So he is once more faced with finding his main man. But it isn't quite the same as having to start anew. "I know the transition team drafted a position paper on what I have suggested," McCann says, "and so to some degree the President's people are aware of what I'm trying to accomplish."

But there is another reason McCann is moving slowly. Once Jimmy Carter became President Carter, McCann explains, resumes came flooding in by the thousands

from people seeking posts in the new Administration. McCann says he understands that "Carter got really fired up" when press reports indicated that the resumes were being consumed by the computer and later regurgitated with a job match. "He doesn't want to come across as a robot," McCann says of the President.

Carter himself has accepted the computer as an important tool, McCann surmises. "Just as the lever expands man's strength, the computer expands human consciousness." And that's what Carter has to get across to the American people, he declares.

McCann is a zealot when it comes to describing the computer's vast capabilities. He claims that Carter has "broken new ground for what is essentially a whole new business area within the information processing industry." The STSC man says the use of sophisticated communications systems by other political figures "has been virtually nil." But four years from now, he projects, "all politicians will be doing something like this."

Even McCann isn't zealous enough to claim the computer clinched the election for Carter. What the computer did, he claims, was streamline campaign operations. The role the computer will play in the White House should be an interesting one. Carter's previous interaction with the computer portends at least three positive factors for the computer community.

First, Jimmy Carter, perhaps more than any past President, appreciates the computer and is convinced that its capabilities are an important aid to the political process. Second, the President is open to suggestions from the data processing industry about computer contributions to government operations. And third, he has no fear of a multivendor system. During the campaign, his camp used computer gear from at least eight different vendors.

There's little doubt that Carter will have a significant impact on the computer community. But until the jolt is felt, the route to follow seems to be the one taken by John McCann: Ask not what Carter can do for the computer community; ask what the computer community can do for Carter. □

• QUICKPLAN™

Report Generating and Quick Planning System

An APL*PLUS® Time Sharing Service



Scientific Time Sharing Corporation

Our business is business—our approach is scientific

QUICKPLAN™

... the APL*PLUS report generating and quick planning system

It's so simple, yet so powerful! QUICKPLAN can benefit almost everyone involved in corporate financial reporting and planning processes.

To begin with, QUICKPLAN handles a wide range of business needs in a fraction of the time required to do the same work manually or by conventional computer methods. Moreover, it can be used by people with no previous programming experience. And QUICKPLAN gives you the results directly from a terminal in or near your office.

What makes QUICKPLAN so fast and powerful?

The powerful heart of QUICKPLAN is APL... a programming language so concise that a single character can do the work of entire statements in other computer languages. APL is extremely logical and easy to use.

QUICKPLAN reports employ the same basic elements you use in setting up day-to-day reports. Titles, headings, line names, plus data, are all it takes to start generating a QUICKPLAN report.

TITLES		
HEADING	HEADING	HEADING
LINE NAMES		DATA
COMMENTS		

What can QUICKPLAN do for you?

You can use QUICKPLAN to help generate income statements, cash budgets, financial reports, "spread sheet" analysis, cash flow projections and other management reports.

In financial planning and modeling, QUICKPLAN can help you with such tasks as forecasting, lease/purchase and make-or-buy decisions, merger and acquisition analysis, profit projections, budget planning, project investment analysis and cash flow analysis.

That's only the beginning. In reality, your applications of QUICKPLAN are limited only by your reporting requirements.

Here's why QUICKPLAN is so great:

Simplicity Easy-to-use modeling tools allow you to concentrate on the problem at hand, not on a complicated computer program. QUICKPLAN even guides you in setting up reports and entering data.

Cost-Effective Whether you're generating a simple report or a highly complex one, QUICKPLAN minimizes report development time. Even the calculations are automated! You'll be amazed at how economical QUICKPLAN is to run.

Flexibility QUICKPLAN can generate reports containing from two to 500 lines! It readily adjusts to serve most reporting needs and can be easily interfaced with other systems.

Responsiveness QUICKPLAN gives you easy access to data and the ability to manipulate it. Response time is within seconds!

Adaptability Changes to models and reports can be made instantly. Once entered, they are processed automatically. Since QUICKPLAN has the capacity to maintain large volumes of data, reports are easily expandable.

Accessibility QUICKPLAN reports can be accessed in all of your offices and branches via our international telecommunications network which is always subject to your control and security requirements.

STSC Customers Reap QUICKPLAN Benefits

In keeping pace with today's business environment, corporate planning has become a complex, involved process demanding more time and attention to detail. Not only does this take more of the corporate executives' time, it requires additional hours from all levels of managerial and clerical personnel in the corporation.

By automating the quantitative and report generating aspects of the planning process, QUICKPLAN reduces the time needed in each procedure and lessens the chances of human error.

QUICKPLAN has already made a difference for these Scientific Time Sharing customers, many of whom had little or no previous APL or computer experience.

The financial executive of a leading transportation corporation in the Southwest needed a faster, more efficient way of formulating alternative financial strategies through modeling. We worked closely with him, first, in developing a planning model, then a budgetary system for the corporation's major subsidiary, a tank line serving nationwide markets. The applications were so easy to use and adapt that he is now writing his own QUICKPLAN applications to solve the firm's other planning needs.

A national casualty insurer located in Fort Worth, Texas, was seeking a way to do long range forecasting. After carefully analyzing competitive products, they turned to STSC and QUICKPLAN. Assisted by their company personnel, we generated a report consisting of an income statement, balance sheet and surplus analysis which consolidated four profit centers with the parent company. With this QUICKPLAN application, the company estimates a 70 percent savings in efforts previously expended to produce a long range plan.

Before this introduction to QUICKPLAN, the company personnel had never used APL. However, they had no difficulty reading QUICKPLAN procedures and are now learning APL through the process of working with the Quick Planning System.

And there's more when you need it!

If you require a more complex application, just look at how another STSC customer is profiting from two QUICKPLAN applications.

The first is an order and tracking system for seven subsidiary companies of a major manufacturer of medical supplies. Orders and shipments from each company to a foreign market are tracked on a monthly basis. The system stores the actual and budgeted data by month for each company and each foreign market. Thus, detailed and summary reports indicating total orders and shipments by company and by country are produced for each month.

The parent manufacturing corporation pays the subsidiaries' commissions based on their shipments, so the second system uses data from the order and tracking system. Actual and budgeted figures are automatically fed from the first system into the commission calculation system. Reports, produced monthly for each company and each foreign market, contain—actual year-to-date shipments; budgeted year-to-date shipments; year-to-date commissions based on actual shipments; forecasted annual commissions; forecasted annual shipments; and budgeted annual shipments.

The list of satisfied QUICKPLAN customers goes on and on, but we want you to get a chance to see QUICKPLAN in action for yourself.

A WORD ABOUT SCIENTIFIC TIME SHARING CORPORATION

Scientific Time Sharing Corporation was founded by some of the same computer professionals who developed the powerful APL programming language. Since 1969 they have continued to enhance and extend the capabilities of APL into a commercially-oriented system and service called APL*PLUS®. This service is amplified and augmented by hundreds of programs and packages in our applications library. QUICKPLAN is just one of them.

People who have never used a computer find they can use APL*PLUS Time Sharing Service effectively after just a brief introduction. While computer professionals find that APL*PLUS Service makes possible the most powerful time sharing techniques ever devised!

THE INTERNATIONAL APL NETWORK

Scientific Time Sharing Corporation customers are served by an international telecommunications network, with local-call access in more than 120 U.S., Canadian and European cities.

We have technical support offices in more than 15 cities. Your nearby STSC representative can provide additional information about QUICKPLAN and the many other applications of APL*PLUS Service.

Scientific Time Sharing Corporation

Our business is business—our approach is scientific.

SCIENTIFIC TIME SHARING CORPORATION
Corporate Headquarters
7316 Wisconsin Avenue
Bethesda, Maryland 20014

BULK RATE
U.S. POSTAGE
PAID
PERMIT NO. 44247
WASH., D.C. 20013

YES! I want to learn more about how QUICKPLAN can work for me!

- Please have an STSC Representative contact me to arrange a demonstration.
- Tell me how APL*PLUS Time Sharing Service can help me solve this particular problem: _____

Please fill in any information not included on the address label at right:

Name	Title	
Company		
Address		
City	State	Zip
Phone ()		

HERE'S QUICK WORK

1 QUICKPLAN is available on STSC's exclusive APL*PLUS System. Simply)LOAD 333 *QUICKPLAN*, then create a file, such as Finance, for storing programs, data and reports.

GPCREATE

G/P SYSTEM NAME? FINANCE

FINANCE CREATED.

In less
build
... in

2 Now, begin building the report generating system (*RGS*) by giving it a name and specifying the number of columns in the data matrix.

BUILDRGS

RGS NAME: BALANCE

HOW MANY COLUMNS? 3

BALANCE CREATED.

3 Enter the title names ... *ENTERTITLES*.

4 Enter column headings ... *ENTERHEADINGS*.

5 Enter line names ... *ENTERLINES*... and any special formats. For instance, the \$ symbol to indicate dollar amounts on appropriate lines.

5

SHOW KPLAN™ WORKS!

In less than an hour, for just a few dollars, you can have a system that produces reports automatically in ten easy steps!

3 GARDEN CORPORATION
COMPARATIVE BALANCE SHEET
(1976 - 1977)

	4 1976	1977	% INCREASE
3 ASSETS			
CURRENT ASSETS:			
1100 CASH	\$3,449	\$3,793	7 9.97
1200 SECURITIES	246	264	7.32
1300 RECEIVABLES	6,829	7,539	10.40
1400 INVENTORY	12,623	13,671	8.30
1500 PREPAID EXPENSE	379	417	10.03
-----	-----	-----	-----
1000 TOTAL CURRENT ASSETS	7 \$23,526	\$25,684	9.17
-----	=====	=====	=====
FIXED ASSETS:			
2100 PROPERTY, PLT, & E&MT.	\$31,525	\$34,380	9.06
2200 (LESS DEPRECIATION)	6 (13,507)	(14,628)	8.30
-----	-----	-----	-----
2000 TOTAL FIXED ASSETS	\$18,018	\$19,752	9.62
-----	=====	=====	=====
3000 TOTAL ASSETS	7 \$41,544	\$45,436	9.37
-----	=====	=====	=====

6 At this point the system will guide you in entering available data . . . ENTERDATA .

7 Write the program (*CALC*) for performing your calculations. For example, the Total Current Assets line 1000 equals (*LEQ*) the line addition (*LADD*) of lines 1100 thru 1500.

```
    ▽ CALC
[1] 1000 LEQ LADD 1100 THRU 1500
[2] 2000 LEQ LADD 2100 2200
[3] 3000 LEQ LADD 1000 2000
[4] 3 CEQ CPCT 2 1
```

▽

8 Next, write the program (*REPORT*) to generate the report. Indicate the width of each field, print titles, headings and line names and any additional comments.

```
    ▽ REPORT
[1] FIELDS 30 12 12 10
[2] TITLES 1 2 3 5
[3] HEADINGS 0 1 2 3
[4] TITLES 4 5
[5] LINES(1100 THRU 1500), U, 1000, D
[6] TITLES 6
[7] LINES 2100, 2200, U, 2000, 3000, D, B
[8] COMMENT '(NOTE: 1977 FIGURES ARE UNAUDITED.)'
```

▽

9 Now, write automatically you type *G* and produc

```
    ▽ GO
[1] GE
[2] GE
[3] GE
[4] NUL
[5] CA
[6] RE
```

▽

THE NEXT TIME IT'S EVEN EASIER

Once you've used QUICKPLAN to generate a report, the "hard" part is over. The next time you want to print out the report, just *LOAD 333 QUICKPLAN* and enter *GO*. Data and format changes are easily made and processed automatically. The possibilities are almost endless!

See QUICKPLAN in Action!

Learn more about QUICKPLAN and our many other APL*PLUS Time Sharing Services. Return the coupon . . . TODAY!

the program (*GOF CN*) which
fully runs the entire process. When
it will get the program, run *CALC*
the *REPORT*
CN
RGS 'BALANCE'
PG 'CALC'
PG 'REPORT'
BERS ON
C
ORT

10 Store the programs in the file . . .
PUTPGM 'CALC'
PUTPGM 'REPORT'
PUTPGM 'GOF CN'
and you are done!

FIRST CLASS
PERMIT NO. 38986
WASHINGTON, D.C.

BUSINESS REPLY MAIL
No postage necessary if mailed in the United States

Postage will be paid by:

SCIENTIFIC TIME SHARING CORPORATION
7316 Wisconsin Avenue
Bethesda, Maryland 20014

APL★PLUS FPS

Building Blocks for Financial Planning



Scientific Time Sharing Corporation APL★PLUS® Service

Scientific Time Sharing Corporation's APL★PLUS® Financial Planning System

The APL★PLUS® Financial Planning System supplies the foundation and building blocks from which you can design your own planning system. Those requirements common to most planning, data management and reporting systems are already programmed, allowing you to concentrate on customizing the system to your specific needs.

Your financial reporting requirements are unique. FPS is not an off-the-shelf package that produces stock answers and limits your flexibility. Check your financial reporting and planning needs against the APL★PLUS Financial Planning System capabilities. Whether your most important need is long-range planning, budgeting, acquisition analysis, foreign currency exposure control or some other financial planning requirement, we have all the features you always wished you had available.

FLEXIBILITY

in building models

- As you design the system, financial library programs and special computations (such as unique tax algorithms) can be installed in the models to handle individual needs.
- FPS accommodates any accounting, financial or business planning models including time-lagged relationships and simultaneous equations.
- Monte Carlo risk analysis and sensitivity analysis capabilities are automatically available in the basic model.
- FPS allows you to model your unique corporate structure including different levels of reporting and using your own time frames—weekly, monthly, quarterly or yearly.

FLEXIBILITY

in reporting

- An unlimited variety of reports can be drawn from a database without changing the database structure or model logic.
- Any result lines can be printed in any order from the database.
- Parameters and model logic can be varied in response to WHAT IF questions without changing your reporting format.
- Programs can be interwoven into the report formatting process to meet special display requirements.
- Calculations and comparisons of data can be performed by the report generator at print time, independent of the model.

OPEN-ENDEDNESS

- FPS capacity will grow as your needs grow.
- A single FPS database accommodates up to 50,000 lines and 2400 columns. Multiple databases allow any size model.
- FPS offers an easy means of manipulating multiple databases from simple summation to individual, line-by-line consolidation.
- Sensitivity testing, risk analysis and other analytical techniques can be applied to existing models at any time.

RELIABILITY

Our APL★PLUS Service, running on an Amdahl 470 V/6, one of the most powerful general purpose computers on the market today, provides over 99 percent availability during prime time hours.

ACCESSIBILITY

FPS is accessed by a local phone call in over 200 cities worldwide, enabling you to communicate with your corporate offices across the country and around the world.

SECURITY

Scientific Time Sharing Corporation's three-level lock system protects your data from unauthorized access.

FPS and Long-Range Planning

- Using FPS for long-range planning allows you to respond to a wide range of WHAT IF questions.
- FPS databases are arranged by line items across a time horizon, so historical data may be stored alongside forecast data.
- With a simple English command, you select the starting point for analyses to be performed on the historical data before the forecast is begun.
- FPS gives you the freedom to choose your own form of historical analysis for each line in your long-range plan—regression analysis, first and second-order time trends, historical ratios and seasonality, for example.
- FPS also lets you select, for any line in your forecast, any number of projection methods, such as growth rates, days-on-hand of inventories or receivables, any lead or lag factor combinations or statistical parameter estimations.
- After forecasting each line of your long-range plan, you can combine the results to create your own financial statements in your own unique reporting format.
- FPS's easy-to-use plotting capabilities offer the opportunity to display results graphically.

FPS and Budgeting

A budgeting system built with FPS can represent your changing corporate structure in terms of its accounting relationships and management style.

- FPS enables the budgeting system to mimic any organizational structure, however complex.
- Your expense or income allocations, regardless of complexity, can be represented in an FPS budgeting system.
- FPS allows you to budget at subunit levels and then consolidate within the same database.
- FPS's flexible database design allows you to treat each budget separately or consolidate budgets along multiple dimensions by: geographic location, time, organization chart, products, activities or special characteristics within your company.
- Budget data can be transferred directly to or from long-range planning systems.
- Variances can be analyzed through modeling or reporting processes.
- FPS's easy update capabilities facilitate continuous reporting and variance analysis including rebudgeting and any special update requirements.

FPS and Acquisition Analysis

In reviewing candidates for purchase, acquisition analysis answers these key questions:

- What has the target company done historically?
- What happens if history repeats itself?
- What if operational changes are made in the future?
- How much should it cost?
- What is the ROI?
- How should it be purchased?

FPS's flexible database management facilitates each step of the acquisition process.

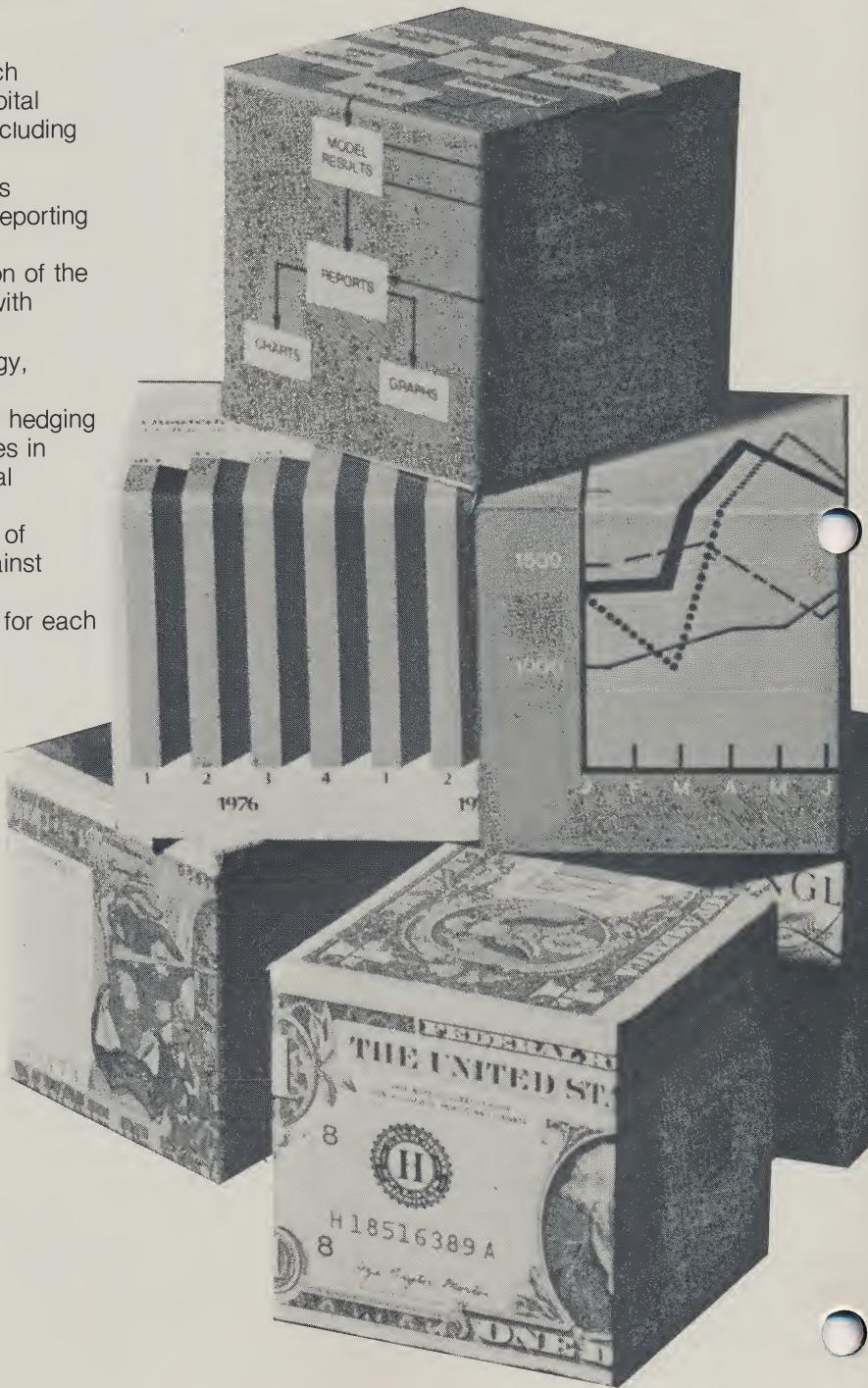
- FPS offers a full range of statistical techniques for projecting trends, including:
 - first and second-order time trends
 - regression analysis
 - average and time-trended historical ratios
 - many other forecasting techniques.
- With FPS, you can develop a Monte Carlo risk simulation which produces the "risk profile" of a forecast. Risk profiles may be more representative than a series of single estimate projections.
- FPS offers the option of storing financial data for each target and for the parent in a separate database. A simple command then allows you to combine the databases which can then be used as an entity for post-consolidation reporting and modeling.
- The line-by-line "merge" feature allows you to consider alternative scenarios, including:
 - forecasting for parent and target companies
 - purchase versus pooling
 - alternative financing considerations
 - ROI analysis
 - post-consolidation modeling.

FPS and Foreign Currency Exposure Control

FPS's database system, combined with modeling capability and forecasting techniques, allows you to build your own foreign currency exposure control system. You can incorporate your own assumptions and design your own strategies.

The FPS features allow you to:

- develop financial accounting data for each national entity by forecasting working capital needs and intercompany transactions, including the tax consequences
- prepare multinational financial statements following FASB guidelines to meet your reporting requirements
- calculate the total gross exposure position of the company both within the company and with respect to the external world
- develop the best exposure control strategy, considering alternative hedging vehicles
- evaluate the cost and result of any given hedging alternative: swaps, barter trading, changes in credit policies, insurance purchases, local borrowing
- compare costs of devaluation with costs of hedging strategy designed to protect against devaluation
- create and maintain separate databases for each foreign subsidiary, with automatic consolidation of accounting data stored in separate currency denominations
- convert financial data into another currency as the report is being printed, regardless of the way the data is stored
- develop a risk profile associated with events beyond the control of the financial planner, such as devaluations, local restrictions and interest rate changes.



Nationwide seminars

Learn More About FPS

Scientific Time Sharing Corporation regularly sponsors FPS seminars in more than a dozen cities in the United States and Europe. Oriented to the results that top management gets from an efficient financial planning system, the FPS Seminar allows you to see first-hand, not only what can be done, but how it is done.

Prior computer experience is not a prerequisite (although computer professionals who see the power of FPS are extremely enthusiastic about it). The whole idea is that one does not have to be a computer expert to obtain results to support current management decisions.

Workshops

STSC also offers training to customers who want to use the Financial Planning System. Two-day FPS workshops provide hands-on experience in creating a database, writing models and printing reports.

FPS workshops are taught by STSC professionals experienced in both FPS and finance, thus the system can be directly related to your needs. To make a reservation or to obtain more information, call your STSC representative or complete the enclosed form.

Consulting

STSC also provides specialized consulting for installing systems using FPS. Installation consultants are familiar with both FPS capabilities and APL. Services range from guidance on designing your own system most efficiently, to full installation of customized large-scale systems tailored to individual client needs, including specialized programming where applicable. To discuss the consulting services most appropriate to your needs, call your STSC representative.



A word about Scientific Time Sharing Corporation

Scientific Time Sharing Corporation was founded in 1969 by some of the computer professionals who developed the powerful APL programming language. They have continuously enhanced and extended the capabilities of APL into the commercially-oriented system and service called APL★PLUS. This service is amplified and augmented by hundreds of programs and packages in our applications library. FPS is just one of them.

APL is particularly popular in financial applications where it is strongly preferred by most professionals with personal experience using it.

People who have never used a computer find they can use APL★PLUS Time Sharing Service effectively after just a brief introduction, while computer professionals find that APL★PLUS Service provides the most powerful time sharing techniques ever devised!

In addition to the powerful APL language, STSC offers a full complement of supportive languages, such as COBOL and FORTRAN.

The International APL Network

Through APL★PLUS International, a wholly-owned subsidiary of STSC, APL★PLUS Service is available in 19 countries, in addition to the United States. In any country in which we operate, access to STSC's central processor (an Amdahl 470 V/6, based in Bethesda, Maryland) is made through a local phone call.

STSC and APL★PLUS International's extensive communications network help multidivisional corporations share data, develop common programs and consolidate financial information.

In surveys conducted by Datapro Research Corporation over the past three years, Scientific Time Sharing Corporation has annually ranked at or close to the top in overall satisfaction among one hundred remote access service companies.

Scientific Time Sharing Corporation and APL★PLUS International are the world leaders in APL—serving businesses and governments throughout the world. Our customers are served by an international telecommunications network, with local-call access in more than 200 U.S., Canadian and European cities.

Your nearby STSC representative, a specialist in delivering solutions to information systems that span the world, can provide additional information about FPS supportive languages and the many other applications of APL★PLUS Service.

Scientific Time Sharing Corporation
APL★PLUS® Service



Scientific Time Sharing Corporation

7316 Wisconsin Avenue
Bethesda, Md. 20014
(301) 657-8220

Scientific Time Sharing Corporation

News

APL★PLUS® Service

7316 WISCONSIN AVENUE, BETHESDA, MARYLAND 20014, 301-657-8220

FOR IMMEDIATE RELEASE

SCIENTIFIC TIME SHARING CORPORATION

ENTERS THE SYSTEMS BUSINESS

BETHESDA, MARYLAND, NOVEMBER 22, 1978 -- Scientific Time Sharing Corporation (STSC) today announced plans to market an IBM 370-compatible minicomputer to be used either as a standalone system or as an extension to STSC's APL★PLUS Time Sharing Service. First customer shipment is expected in the first quarter of 1979. The system, named the QUAD 100, will be offered with STSC's proprietary APL★PLUS Service software and is available in two models which outperform the IBM 370/138 and 148.

STSC simultaneously announced two software products also directed at the "In-house" market. The first of these products is a series of VSAPL enhancements, beginning with formatting and file management -- features designed to run under control of VM/370 as an interactive processor. The second product is the full APL★PLUS System running under MVT or as a "virtual machine" under VM/370. The QUAD 100 system and the two APL-related software products will comprise a full range of options for in-house time sharing.

(MORE)

STSC President Daniel Dyer said that the new offerings are expected to attract new customers who need the application software that has been developed in APL as well as the programming flexibility of APL. Further, Dyer feels that many universities will find the QUAD 100 system attractive because the company is offering a complete set of administrative software to facilitate management control of the system and because of the rapidly increasing popularity of the APL language. Several universities and government agencies are already using an earlier version of the APL*PLUS software, Mr. Dyer noted.

Much of the interest in the hardware and software products is expected to be generated as a result of STSC's experience in developing systems for corporate financial management. This is the predominant area in which the APL language is being used today, according to a company spokesman. STSC will offer its Financial Planning System (FPS) and Comprehensive Manufacturing Control System (CMCS) for in-house use. FPS is a widely-used financial planning and modeling tool which is particularly adaptable to multi-divisional and diversified corporation planning environments. CMCS is a system to assist large discrete manufacturers in shop floor control, forecasting and material requirements planning.

Scientific Time Sharing Corporation is the largest U.S. supplier of remote computing services based on the APL language. Its services and products are supported through 15 offices in the United States and 4 in Europe. Further information can be obtained from Robert E. Cook, Vice President, at (301) 657-8220.

**Before you say
you're happy with
your VM Service,
check the bottom
line.**



APL★PLUS VM Service

A new offering from Scientific Time Sharing Corporation.

Scientific Time Sharing Corporation, largest U.S. supplier of APL time sharing services, announces:

APL★PLUS VM Service

an expansion of our APL★PLUS® Service, based on IBM's VM/370 and featuring a full complement of programming languages.

VSAPL • FORTRAN • COBOL • PL/1 • BASIC•ASSEMBLER • MPSX • SCSS

...and more

**NOW...
APL★PLUS
Service
...PLUS**

Why is an APL company offering VM?

STSC's VM offering is the answer to our APL★PLUS Service customers' search for a cost-effective service for running their non-APL time sharing work. Now we can satisfy their needs and your needs.

The same well-known reliability inherent in our APL★PLUS Service is part of the VM service, along with a wide selection of programming languages and proprietary software.

Why STSC's VM Service?

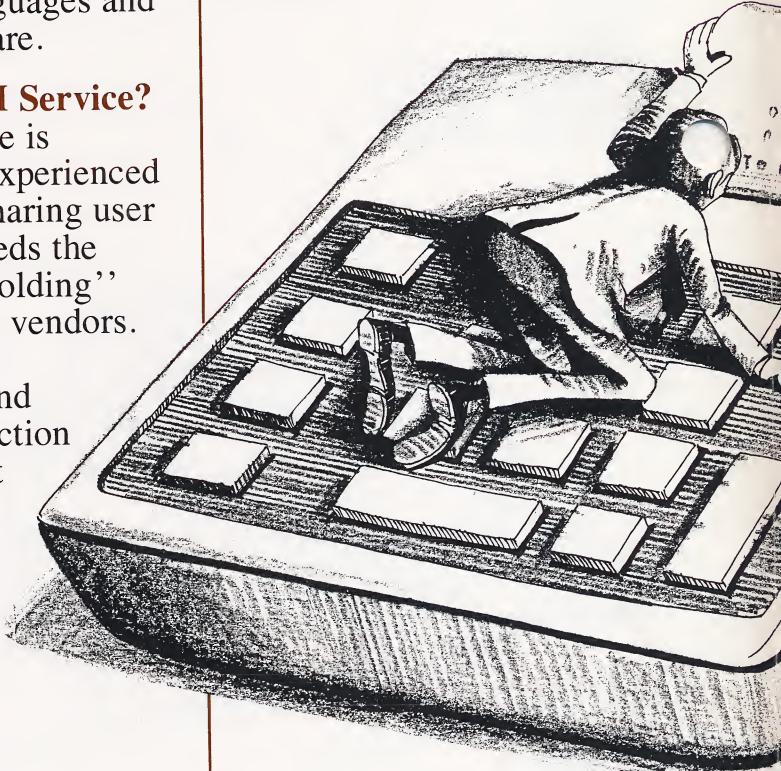
Our VM Service is designed for the experienced VM-based time sharing user who no longer needs the extensive "handholding" provided by some vendors. If you are using a fully-developed and operational production system, you don't need to pay premium prices.

What do I get with STSC's VM Service?

- Low Cost
- Full System Support
- Extensive Language Availability
- A Reliable, Sophisticated System
- In-depth VSAPL Customer Support

How do I know if I'm a good VM prospect?

You are if you satisfy two or more of the following criteria:



- 
- Spend more than \$10,000 per month on any of these services:
 - Boeing Computer Services (Mainstream-CTS)
 - Tymshare's TYMCOM/370
 - National CSS
 - Interactive Data Corporation
 - Are a large VSAPL user
 - Need a national network to run a stable production time-shared system.

About Scientific Time Sharing Corporation

Scientific Time Sharing Corporation has been providing solutions to business information processing problems since 1969. The company was founded by some of the computer professionals who developed the powerful APL language. They have continually enhanced and extended the capabilities of APL into the commercially-oriented system and service called APL★PLUS. This service is amplified and augmented by hundreds of programs and packages in our applications library.

With our new VM Service offering, we stand ready to service even more of the constantly changing information processing needs of the business community.

International Network

Through APL★PLUS International, a wholly-owned subsidiary of STSC, APL★PLUS Service and our new VM Service offering is available in more than 20 countries.

Worldwide Access Through a Local Phone Call

Access to STSC's APL★PLUS Service and VM Service is available worldwide through a local phone call.

Your nearby STSC representative, a specialist in delivering solutions to information systems that span the world, can provide additional information about our VM Service, APL★PLUS Service and their applications. Call the STSC office nearest you. A complete listing can be found on the back page of this brochure.

Corporate Headquarters
SCIENTIFIC TIME SHARING
CORPORATION
7316 Wisconsin Avenue
Bethesda, Maryland 20014
(301) 657-8220

International Headquarters
APL★PLUS INTERNATIONAL
747 Third Avenue
New York, New York 10017
(212) 751-9305
TWX 7105812254

U.S. Marketing Offices
Boston
462 Boylston Street
Suite 305
Boston, Massachusetts 02116
(617) 267-6864

Chicago
1550 Spring Road
Oak Brook, Illinois 60521
(312) 530-7600

Dallas/Ft. Worth
1525 Elm Street
Suite 2110
Dallas, Texas 75201
(214) 263-4577

Denver
410 – 17th Street
Suite 1110
Denver, Colorado 80202
(303) 893-3545

Detroit
100 Renaissance Center
Suite 2910
Detroit, Michigan 48243
(313) 259-0220

Hartford
111 Pearl Street
Suite 401
Hartford, Connecticut 06103
(203) 549-0107

Honolulu
691 Kalanipuu Street
Honolulu, Hawaii 96825
(808) 395-8669

Houston
7000 North Freeway
Suite 700
Houston, Texas 77076
(713) 691-6319

Los Angeles
21243 Ventura Blvd.
Suite 240
Woodland Hills, California 91364
(213) 340-4611

New York
747 Third Avenue
New York, New York 10017
(212) 751-9305

Philadelphia
3 Penn Center Plaza
Suite 2003
Philadelphia, Pennsylvania 19103
(215) 564-3980

Raleigh/Durham
400 Eastowne Drive
Suite 108
Chapel Hill, North Carolina 27514
(919) 493-2478

San Francisco
Spear Street Tower
1 Market Plaza Building
Suite 1601
San Francisco, California 94105
(415) 777-4357

Washington, D.C.
7101 Wisconsin Avenue
Suite 1414
Bethesda, Maryland 20014
(301) 986-1750

White Plains
7 Holland Avenue
White Plains, New York 10603
(914) 428-6910

International Offices
West Germany
APL★PLUS International
(Deutschland) GmbH
Cecilienallee 68
4000 Düsseldorf 30
West Germany
(0211) 45-06-01

England
APL★PLUS Limited
50-52 Chancery Lane
London WC2 A1HL, England
01-242-8135

Spain
APL★PLUS International, S.A.
Dr. Fleming 35
Madrid-16
Spain
457-62-66

France
Société de Traitements et de
Services Conversationnels
(Independent Distributor)
Tour Neptune, Cedex N° 20
92086
Paris La Défense, France
773-7964

Special Services Offices
Banking Services

747 Third Avenue
New York, New York 10017
(212) 751-9305

Communications Planning
7316 Wisconsin Avenue
Bethesda, Maryland 20014
(301) 657-8220

Interactive Financial Analysis
7 Holland Avenue
White Plains, New York 10603
(914) 428-6910

Management Technology
7316 Wisconsin Avenue
Bethesda, Maryland 20014
(301) 657-8220

Manufacturing Services
462 Boylston Street
Suite 305
Boston, Massachusetts 02116
(617) 267-6864

1190 S. Bascom Avenue
Suite 214
San Jose, California 95128
(408) 287-9820



History

UNITED COMPUTING SYSTEMS, INC.

United Computing Systems, Inc., was formed in 1967 when United Telecommunications, Inc., acquired Automated Data Service Company, a small organization pioneering computer information services. The union is a wedding of two significant technologies — communications and computing — backed by the human and financial resources of United Telecom.

United Computing is a subsidiary of United Telecom, the parent company of the United Telephone Systems, the second largest independent (non-Bell) telephone company in the nation. The United Telephone System serves more than 3.3 million telephones throughout the United States.

- United Telecom's total assets are in excess of 2.5 billion dollars (listed 160th in Forbes "Top 500" U.S. Corporations).
- More than 27,500 United employees serve the nation's communications needs.

From this solid foundation, United Computing has become a leader in the industry. The past few years of prodigious growth have produced a mature organization that prides itself in being a "total service" computing organization.

One basic concept has been retained that separates United Computing from conventional services . . . a single datacenter for the nation served by a national data communications network.

The key advantage of the National Datacenter concept lies in the elimination of redundant facilities and storage. This assembly of some of the world's largest computers in a single complex offers significant economies of scale to the user's advantage. Special emphasis is placed on system reliability, security and an uninterruptible power system.

United Computing Systems makes available not only the specialized hardware of advanced computers but also the software and programming assistance necessary to implement individual customer applications. Each United Computing customer is assigned a highly-skilled analyst to provide programming assistance, individual or group training and to ensure efficient and timely computer results.

United Computing's support represents more than 1,000 man-years of EDP experience in research, development, applications and operations. In the event an analyst doesn't have the answer to a specific problem, in-depth support is only a phone call away. United Computing systems and applications programs are backed by extensive user-designed documentation.



History

United Computing's principle product offering is a time-sharing, remote job entry, remote batch and local batch service called APEX/SL. This service, first offered in November, 1969, is now implemented on macrocomputer complexer designed to United Computing's specification.

Detailed information on United Computing's services, systems, languages and applications is available on individual sheets:

• SYSTEMS

MAX (Operating System)
APEX/SL Remote Batch
APEX/SL Remote Job Entry
System Configuration
APEX/SL Time-Sharing
UNINET

AUTOFLEX/DYNAFLEX

Business/Financial
Chemshare
Engineering
FORESIGHT
IMSL
LESS/TIME
MARE ISLAND PIPING
MEDSI
NASTRAN
SPACE
SPSTRESS
STRAN
Structural Engineering
Syngineering
SYSPRO Library
TRIFLEX
UCSAPT

• LANGUAGES

BASIC/SUPER BASIC
FORTRAN/SUPER FORTRAN
IFM
MINIDATA
PROSE
System 2000
UNIEDIT

• APPLICATIONS

ANSYS

For more information, contact your local United Computing representative.

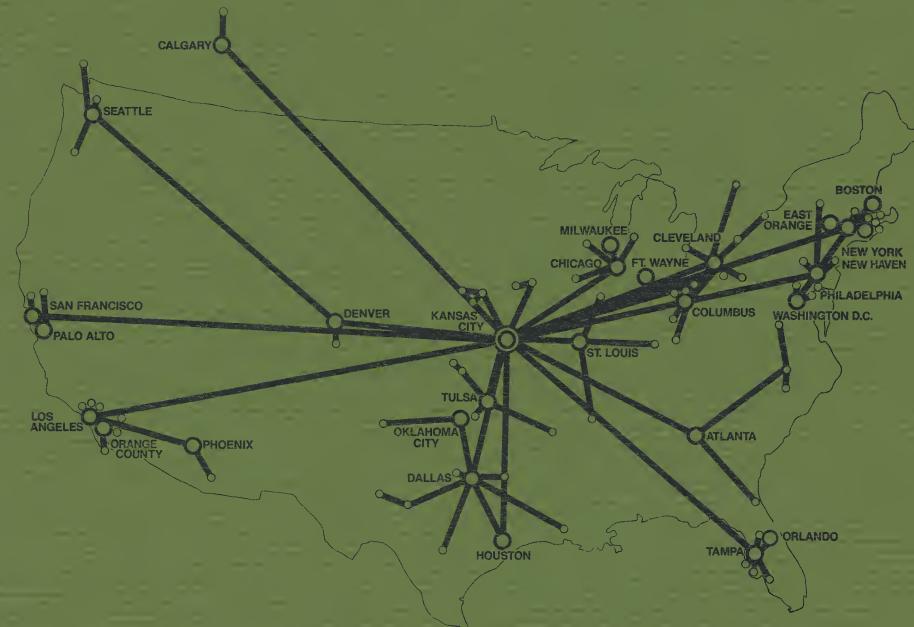
UNINET

UNITED COMPUTING SYSTEMS' NATION-WIDE COMMUNICATIONS NETWORK

Nearly 100 cities across the country are now United Computing cities, provided with toll-free telephone access to our National Datacenter in Kansas City. The data from remote terminals is transmitted via data concentrators and high-speed multiplexor circuits to our computer complex . . . and the data is transmitted reliably, with automated error detection/correction and internal line-signal checking.

Serving all computers in United Computing's Datacenter, UNINET provides a common interface to United Computing Systems for a wide range of terminal devices:

- Standard 10, 15, 30 and 120 cps keyboard terminals
- CRTs
- Plotters
- Remote batch terminals, including free-standing computers with a high-speed line capability.



The UNINET Communications Processor is a large-scale CDC-6000 Series computer dedicated solely to the data communications requirements of our users. Data transmission rates start at 110 baud and go as high as 9600 baud.

No matter what kind of processing you require, we've got your number. Why not get ours?



Systems

UCS SALES OFFICES

ATLANTA
 Bldg. 1, Suite 106
 5825 Glenridge Drive N.E.
 Atlanta, Georgia 30328
 Phone: (404) 256-3610

BOSTON
 Fourth Floor
 1050 Massachusetts Avenue
 Cambridge, Massachusetts 02138
 Phone: (617) 661-1720

CALGARY
 Suite 1910
 Bow Valley Square 2
 P. O. Box 9235
 Calgary, Alberta, Canada T2P2W5
 Phone: (403) 265-4926

CHICAGO
 Suite 1016
 150 North Wacker Drive
 Chicago, Illinois 60606
 Phone: (312) 782-0865

CLEVELAND*
 Two Commerce Park Square
 23200 Chagrin Blvd.
 Beachwood, Ohio 44122
 Phone: (216) 464-9205

COLUMBUS*
 P. O. Box 781
 Delaware, Ohio 43015
 Phone: (614) 548-6371

DALLAS
 Suite 1112, Twin Towers South
 8585 Stemmons Freeway
 Dallas, Texas 75247
 Phone: (214) 638-8260

DENVER
 Suite 20C
 2460 West 26th Avenue
 Denver, Colorado 80211
 Phone: (303) 458-8001

HOUSTON
 4544 Post Oak Place
 Suite 346
 Houston, Texas 77027
 Phone: (713) 622-5351

KANSAS CITY
 500 W. 26th Street
 Kansas City, Missouri 64108
 Phone: (816) 221-9700

LOS ANGELES*
 Suite 410
 101 Continental Boulevard
 El Segundo, California 90245
 Phone: (213) 640-0891

MILWAUKEE
 Suite 775
 2300 North Mayfair Road
 Wauwatosa, Wisconsin 53226
 Phone: (414) 475-9392

NEW HAVEN
 35 Worth Avenue
 Hamden, Connecticut 06518
 Phone: (203) 288-6287

NEW YORK
 Suite 1847
 Two Pennsylvania Plaza
 New York, New York 10001
 Phone: (212) 563-8484

NEWARK
 1767 Morris Avenue
 Union, New Jersey 07083
 Phone: (201) 964-6050

OKLAHOMA CITY
 Suite 252
 Northwest Office Center
 4334 N.W. Expressway
 Oklahoma City, Oklahoma 73116
 Phone: (405) 843-9784

ORANGE COUNTY*
 4120 Birch
 Suite 101
 Newport Beach, California 92660
 Phone: (714) 752-9551

ORLANDO
 Suite 142
 7200 Lake Ellenor Drive
 Orlando, Florida 32809
 Phone: (305) 855-1810

PALO ALTO*
 Suite 217
 1032 Elwell Court
 Palo Alto, California 94303
 Phone: (415) 964-6990

PHILADELPHIA
 Suite 210
 500 Office Center
 Ft. Washington, Pennsylvania 19034
 Phone: (215) 542-8600

PHOENIX
 Suite 104
 5350 N. 16th St.
 Phoenix, Arizona 85016
 Phone: (602) 248-9176

SAN FRANCISCO*
 525 Hearst Building
 3rd & Market Streets
 San Francisco, California 94103
 Phone: (415) 495-6850

SEATTLE
 Suite B
 Koll Commerce Center
 699 Strander Blvd.
 Tukwila, Washington 98188
 Phone: (206) 243-8041

ST. LOUIS
 Suite 101 West
 7750 Clayton Road
 Clayton, Missouri 63117
 Phone: (314) 781-0123

TAMPA
 Suite 518
 1000 Ashley Drive
 Tampa, Florida 33602
 Phone: (813) 223-3921

TULSA
 Suite 404
 16 East 16 Street
 Tulsa, Oklahoma 74119
 Phone: (918) 582-7291

WASHINGTON, D.C.
 Suite 300
 7700 Leesburg Pike
 Falls Church, Virginia 22043
 Phone: (703) 821-1022

NATIONAL DATA CENTER
 2525 Washington
 Kansas City, Missouri 64108
 Phone: (816) 221-9700

CORPORATE OFFICES
 2525 Washington
 Kansas City, Missouri 64108
 Phone: (816) 221-9700

*Registered in California
 and Ohio as UCS, INC.

CITIES SERVED: Akron, Ohio; Amarillo, Texas; Atlanta, Georgia; Austin, Texas; Bartlesville, Oklahoma; Bloomington, Illinois; Calgary, Alberta; Cambridge, Massachusetts; Carlisle, Pennsylvania; Charlottesville, Virginia; Chicago, Illinois; Cleveland, Ohio; Colorado Springs, Colorado; Columbia, Maryland; Columbus, Nebraska; Concord, California; Covington, Kentucky; Dallas, Texas; Davenport, Iowa; Delaware, Ohio; Denver, Colorado; Des Moines, Iowa; Detroit, Michigan; Durham, North Carolina; Emporia, Kansas; Erie, Pennsylvania; Everitt, Washington; Fayetteville, North Carolina; Fort Myers, Florida; Fort Wayne, Indiana; Grand Prairie, Texas; Grinnell, Iowa; Hamden, Connecticut; Hartford, Connecticut; Houston, Texas; Hutchison, Kansas; Indianapolis, Indiana; Jackson, Michigan; Johnstown, New York; Kansas City, Missouri; Lafayette, Louisiana; Lakeland, Florida; Lathan, New York; Leesburg, Florida; Lenexa, Kansas; Lexington, Kentucky; Lincoln, Nebraska; Little Rock, Arkansas; Long Beach, California; Los Angeles, California; Louisville, Kentucky; Madison, Wisconsin; Mansfield, Ohio; Marion, Ohio; Memphis, Tennessee; Middletown, Connecticut; Midland, Texas; Milwaukee, Wisconsin; Minneapolis, Minnesota; Monrovia, California; Muskegon, Illinois; New Haven, Connecticut; New York, New York; Newark, New Jersey; Newport Beach, California; Oklahoma City, Oklahoma; Omaha, Nebraska; Orlando, Florida; Palo Alto, California; Philadelphia, Pennsylvania; Phoenix, Arizona; Pittsburgh, Pennsylvania; Plainview, New York; Pomona, California; Portland, Oregon; Princeton, New Jersey; Providence, Rhode Island; Reading, Pennsylvania; San Angelo, Texas; San Antonio, Texas; San Diego, California; San Francisco, California; San Mateo, California; Santa Barbara, California; Sarasota, Florida; Seattle, Washington; Spartanburg, South Carolina; Stamford, Connecticut; St. Louis, Missouri; St. Petersburg, Florida; Tampa, Florida; Toronto, Ontario; Tucson, Arizona; Tulsa, Oklahoma; Tyler, Texas; Vancouver, British Columbia; Washington, DC; White Plains, New York; Wichita, Kansas; Wilmington, Delaware.



FINANCIAL PLANNING AND ANALYSIS

Up-to-date financial information guides managers in exploring answers to such important questions as:

- What if we increase our capital expenditure by 25%?
- What if we do not achieve our projected revenues?
- Can we reduce corporate operating expenses by maintaining bank balances to within 1% of established goals?
- Can we make funds in excess of bank balances available for more profit-bearing investments or as deferments to corporate borrowings?
- Can we combine 150 different government and commercial contracts on which technical effort is performed, to evaluate each program's contribution and each organization's financial responsibility to achieve more effective cash planning?

United Computing's financial services bring you the capabilities to explore these decisions in depth. With United Computing's business/financial offerings you can consolidate and analyze financial information in your own office. You can respond to changes and new opportunities quickly. We can provide you with report and analysis tools for market and production plans, corporate budgets, business forecasts, performance analysis and financial control reports.

FORESIGHT® - BUSINESS ANALYSIS AND REPORTING

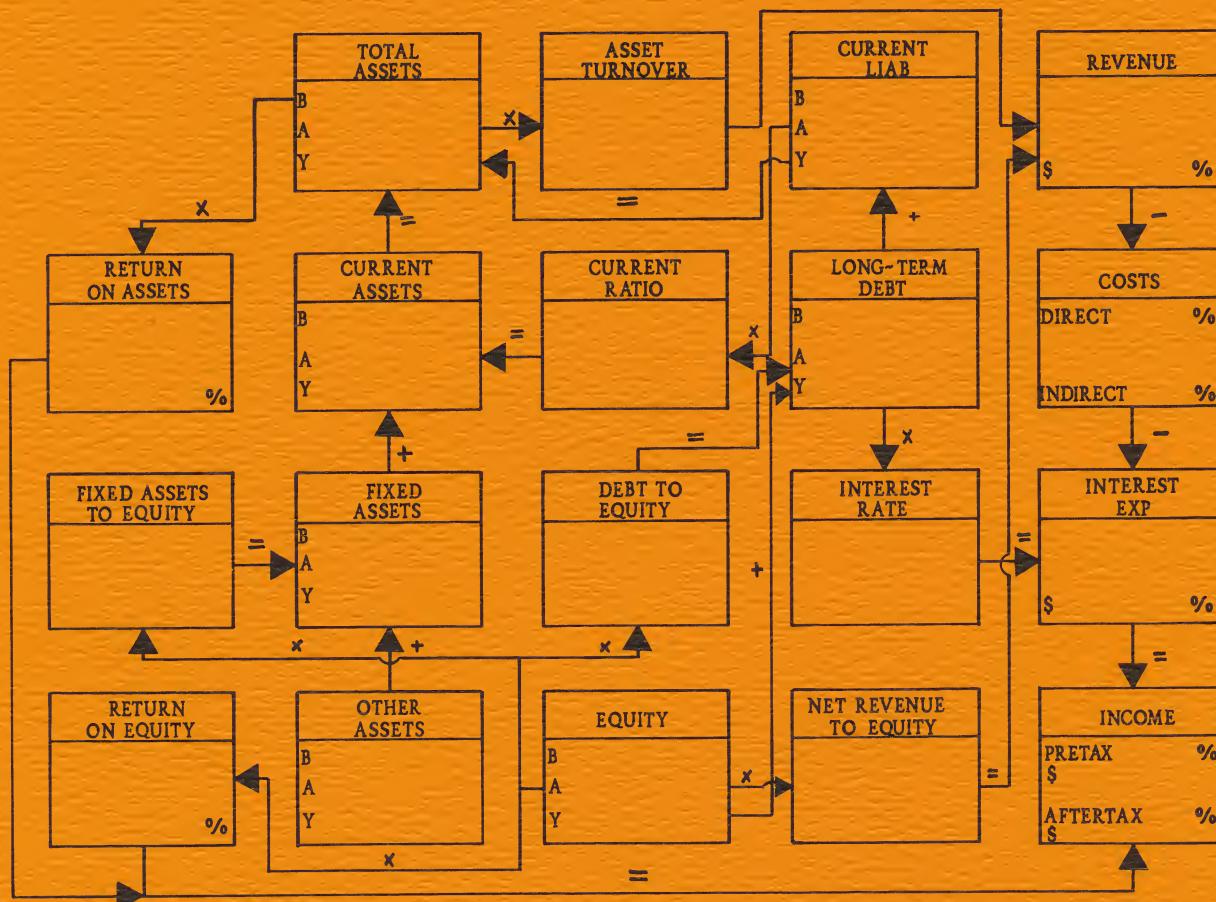
"FORESIGHT" is an easy to use and modestly priced computer program for financial modeling. Data-Pro selected "FORESIGHT" for the 1975 Software Honor Roll after conducting an extensive survey of users. "FORESIGHT" can be used to prepare financial models and at the same time be your corporate financial system. It is actively being used by more than 250 Fortune 1000 firms. Senior corporate management, presidents, vice presidents of finance, controllers, and executive vice presidents receive and use output generated by "FORESIGHT" models.

"FORESIGHT" is not only a financial *modeling* language, it has also been developed into a business *application* language, one that is capable of being efficiently used in a production environment for periodic management reports and comprehensive financial reporting systems, with special emphasis on data entry, data manipulation, and reporting.

The ability to ask "What If" to many different assumptions and calculation methods without having to redesign the structure of the entire financial model is a major benefit of "FORESIGHT." For example, you may want to design a financial model of your business that includes both P&L and balance sheet items. Figure 1 shows a *generalized* model of the firm. This model allows the chief financial officer to identify financial targets, review progress on a regular basis and make corrective action so the firm meets its established goal.

For example, it is usually the *excess* of assets over supporting liabilities and equity that is the amount that must be borrowed (or stock sold) in year X to bring things into balance. If *current interest* is made to reflect this added increment to debt then the increment of interest will work to reduce profit, which will cause retained earnings to gross less than previously thought. That changes the out-of-balance amount on the balance sheet, which changes debt, which changes interest, and so on... A proforma projection of this type can easily be done using "FORESIGHT."

FINANCIAL OBJECTIVES



B — beginning year
 A — average year
 Y — end of year

Figure 1

FORESIGHT is based on an English language command structure using a businessman's terms. It is easy to learn and use, with no programming knowledge required. At the same time, the extended features of FORESIGHT make it a powerful language, capable of a wide variety of applications. Self-documentation of all the model logic, relationships, and data may automatically be printed. This same feature makes model conversion from one computer system to another virtually automatic.

The same program can be used in a time-sharing, remote job entry, or batch environment, depending on the MODE Command. "FORESIGHT" is available nationwide from United Computing's time-sharing network, can be purchased for in-house installation for the major computers, and is available overseas from a number of service bureaus. Single and double precision versions are available, as required. An active Users Group provides impetus for a continual development program and for the exchange of ideas on "FORESIGHT" use.

Special Features

Financial Routines: AMORTIZE, ANNUITY, DEPRECIATE, DISCOUNT, PRESENT VALUE, RATE OF RETURN, SPREAD.

Consolidation: By entire models, reports, selected lines or columns.

Logical and Arithmetic Operators: Includes Conditional IF, Branching, AND/OR ELSE, GO TO, as well as the conventional arithmetic operators.

Data Base: History Files for retrieval, update, and modification of models.

Access Protection: Two-level protection to permit or restrict access to files.

DATAIN-DATAOUT: Permits interaction with other files or programs.

Sensitivity Analysis; Risk Analysis: Possible through FORESIGHT techniques.

Statistical Forecasting: Linear regression, projection, simple and double exponential smoothing, seasonality, learning curves.

Output Reporting: Flexible Variable Report Writer as well as Plotting.

Simultaneous Linear Equations: SOLVE Command for matrix of 12 unknowns.

ACCUFOR® - TIME SERIES FORECASTS

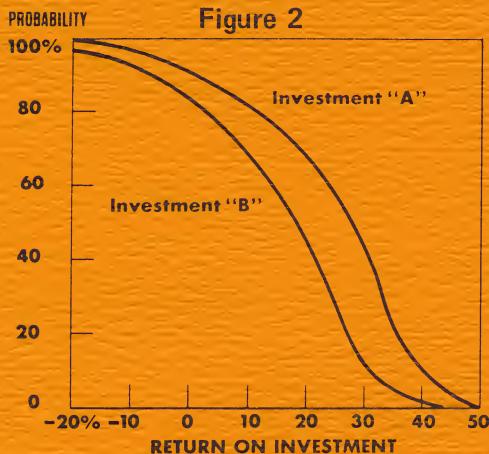
A business manager develops ways of looking at the near future: tomorrow, next week, next month. He has to have some way to decide how much inventory to stock, how many people to hire, how much cash to have on hand. Many accounting and control methods are used to this end. But ACCUFOR is especially helpful when the situation is uncertain and complicated by many factors. Short and long-range forecasting certainly are involved in resource balancing, activity sequencing, and resource acquisition, and ultimately, in how overall capital investment can be built and used.

ACCUFOR can help you analyze these problems. ACCUFOR uses 2 to 7 years of history to make a projection. The data can be weekly, monthly, retail month, bimonthly or quarterly. ACCUFOR integrates up to five independent variables (control files) into the forecast so that causal relationships may be studied. It generates a historical analysis for evaluating and qualifying the effects of past events. A graph of the forecasted data and/or the forecast with the history is available. Because of its ease of use, ACCUFOR permits the business user to concentrate his efforts on understanding the data, rather than the statistical method involved. Most important though, is the high degree of accuracy found in ACCUFOR forecasts.

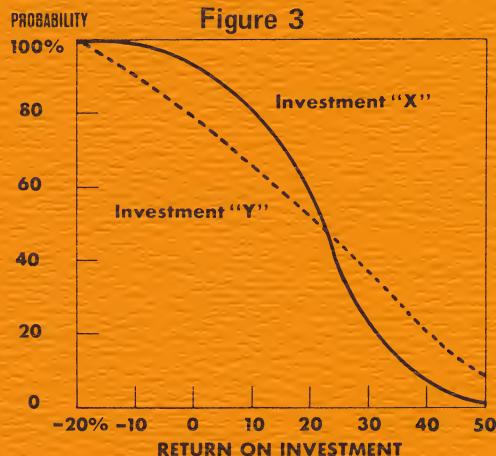
RISK/FINANCE

This program provides deterministic analysis and reporting, sensitivity analysis and risk analysis using Monte Carlo simulation methods. The risk analysis approach is useful to top management decision making in situations where considerable uncertainty is associated with the future environment and with factors affecting the decision. Risk analysis provides management with specific information on the level of risk that it will incur in taking a particular course of action.

Because Risk/Finance can tell management which factors contribute most significantly to risk, management may be able to take steps to influence those factors.



Investment "A" clearly is better than "B" . . . e.g., For any return, the chances are higher that A will achieve it. . .



Investment "X" has a better chance than "Y" of producing 10 percent ROI, but . . . investment "Y" has a better chance of producing a 40 percent ROI.

Figures 2 & 3 illustrate investment risk profiles, each comparing two investments. RISK/FINANCE output performs this type of sensitivity analysis.

CTREE

This program generates and evaluates complex tree structures, specifically decision and probability trees. It includes a language for specifying trees that allows embedded FORTRAN code.

It is usually impossible to think through a decision that must be made now without at the same time thinking through some decision or decisions that may have to be made at some time in the future. CTREE is a program that uses a decision tree structure to portray future events and actions. A decision tree is a useful aid in *sequential decision problems* . . . problems that involve a sequence of interrelated decisions over time. CTREE generates and evaluates a tree structure whose main elements are *decisions* and *chance events*.

Figure 4 illustrates the general structure of a simple decision tree.

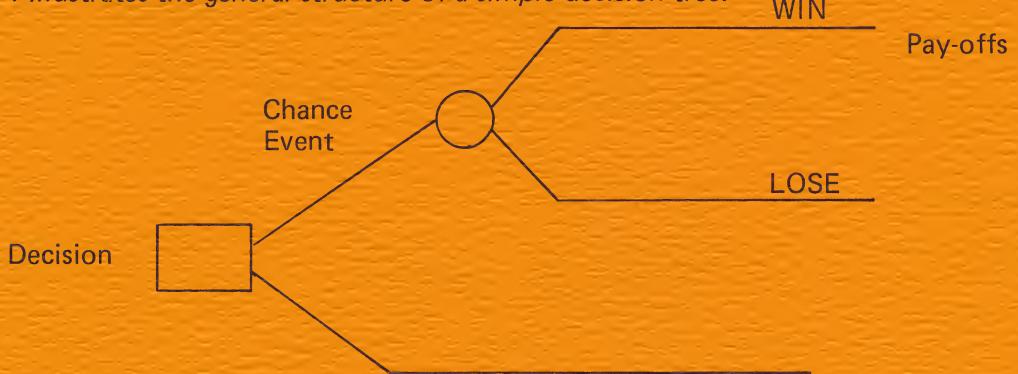


Figure 4

NBER

The National Bureau of Economic Research (NBER) data bank, contains approximately 3000 economic time series from 1946 onward. These series contain mainly national data on a monthly, quarterly and annual basis.

Although most information contained in the NBER data bank is historical, forecast series are provided, including widely used economic indicators. Historical data for these indicators, whether leading, lagging or coincident, are also included.

The following types of series are available in NBER:

<i>TYPE OF SERIES</i>	<i>NO. AVAILABLE</i>
National Income and Product Accounts	1000
Manufacturer's Shipment, Inventories, Orders	140
Retail and Wholesale Trade and Inventories	30
Construction and Housing	30
New Plant and Equipment Expenditures	30
Industrial Production	80
Population, Labor Force and Employment	120
Productivity and Unit Labor Cost	30
Prices	80
Financial Series	220
Balance of Payment	30
Federal Fiscal Operations	20
Miscellaneous and Recently Added	500

The National Bureau of Economic Research, the originator of the data bank, is a nonprofit research center which has applied quantitative and objective economic analyses to basic problems of national and international importance. Numerous statistical innovations developed at the Bureau have been adopted and published by the federal government. These include: estimates of the gross national product and national income accounts; leading, lagging, and coincident economic indicators used to help forecast business conditions; labor productivity estimates; and statistical series on consumer credit and on the flow of funds.

SPSS ®

An integrated system of computer programs to perform statistical analysis, SPSS enables a researcher to perform many different types of data analysis.

For example, SPSS is often used by a market research department to perform questionnaire analysis. Until the survey is tabulated, you really can't begin to interpret the results. The sooner the results get back, the better. The data processing department can probably handle it again, but it will take at least two weeks. And your internal computer system is so overscheduled, it could take a month. SPSS offers a practical alternative: always available on United Computing's nationwide computer system, SPSS is ready to meet your statistical requirements.

The SPSS package contains more than twenty-five statistical routines. One of these routines is a multivariate analysis, the familiar workhorse of analytical techniques. MVA techniques deal with both qualitative and quantitative data to estimate possible relationships. The distinguishing

feature of MVA, a predictive technique, is that one or several variables are said to be a function of some other variable. For instance, the automotive industry seeks to predict new car sales with information from the Gross National Product, consumer price index, annual scrappage rates of old automobiles, and a host of other factors. Thus annual new car sales is described using MVA, as a function of these variables. For those managers not concerned with prediction, SPSS may be used as a descriptive multivariate tool to provide meaning to a data base. What at first glance may appear as a sterile and uninteresting set of facts regarding consumer attitudes toward a new product can be transformed into very valuable information with the aid of these techniques in SPSS.

The United Computing library offers a number of programs to solve problems in business and finance. The program dialogue is constructed so that you enter your data and let the program compute the analysis for you. No programming experience is necessary. Results are printed automatically in a clear format. Programs available include:

ANNUIT	Calculates payment annuities, withdrawal annuities, and mortgage and loan payments.
DEPREC	Computes depreciation by four methods: straight line, double declining balance, sum-of-year digits, and 150 per cent declining balance.
DISRAT	Calculates the discounted rate of return on actual or projected cash flows and prints a straight payback table.
GROWTH	Calculates growth rates using data supplied for a number of equi-spaced periods; the computed rate may be projected forward for "n" future periods.
LESSEE	Uses the Bower-Williamson method of analysis to compare a lease with the purchase of equipment. The equipment is depreciated on sum of the year digits, and the appropriate tax credit is taken for the purchase alternative.
LESSOR	Calculates the rate of return which the lessor receives for investing in an asset and then leasing it to someone else, i.e., the interest rate which discounts all of the net cash flows back to the initial investment the lessor must make. By comparing this after tax rate of return with the returns expected from alternative investments, the lessor determines the desirability of the lease.
SAVING	Computes the total funds resulting from an initial deposit compounded at a user-specified rate for a given number of years.
TRUINT	Calculates annual interest on installment loans.

FORESIGHT®

(A development of Foresight Systems, Inc., Los Angeles, California)

FORESIGHT is a tested management tool for planning, control, financial reporting and modeling. It makes the speed and accuracy of high-speed computers available on a businessman's terms — not a programmer's. It provides ready access to the computer through ordinary English instructions to prepare financial analyses and management reports of all types. FORESIGHT will accept simple or complex changes to plans or budgets and will quickly produce reports detailing the impact of these changes. United Computing's National Data Center and Communications Network, UNINET, make FORESIGHT available to companies and their subsidiaries across the United States.

FORESIGHT is both a business language and a computer program. It's easy to use and can be mastered in only a few hours. All you have to do is to provide the computer the data you have (net Sales, Labor Costs, etc.) for the period desired and the computations you want performed. The reports will be produced in minutes. And, if you're not satisfied with these first results, alternative estimates or assumption may be evaluated.

FORESIGHT's vocabulary consists of about 60 English commands that are easy and natural to anyone preparing a management report. A FORESIGHT user's basic orientation is simply to the lines and columns of the reports. Attention is focused where it should be - on the reports instead of on the computer. FORESIGHT will keep track of your data for you. It will save your data so you can "sleep" on the results and then come back to try another version of the reports. Agreed upon formats for department reports, budget reports, may be stored and used on a periodic basis by all departments or divisions of a company. Each department may add features unique to its operations. Reports can be requested in a different format and any number of reports can easily be consolidated. And, as often as necessary it will produce an audit trail which displays the current status of every line in your reports with the estimates and computational relationships you've defined for each.

The simplicity and versatility of the FORESIGHT language let you easily adjust your management reports or financial models to adapt to changing business conditions or to changes in the organization. You need no longer be restricted by the rigid structure of conventional computer programs. As conditions change, you simply specify what new data or parameters you would like incorporated in your management report. The self-documenting feature of FORESIGHT gives you an instant and permanent record of any changes made in the logic or structure of the particular model.

An ongoing development program ensures that FORESIGHT will be continually improved and updated. New features are constantly being developed to expand FORESIGHT's capabilities and make it easier to use. An active FORESIGHT User's Association holds annual meetings for the exchange of new ideas and techniques.

FORESIGHT offers the user the advantages of a comprehensive financial modelling tool which is easy to use, modestly priced and available throughout the United States and Canada.

FORESIGHT FEATURES

Listed below are some of the features of FORESIGHT, ones that make it capable of producing financial models and analyses, ranging from simple to complex, consolidated corporate returns, and comprehensive management reporting systems. Among these features are:

FINANCIAL ROUTINES — These routines can be incorporated as an integral part of the logic of a model or on a stand-alone basis to perform ad hoc analyses. For example, RATE OF RETURN can be used as one of the lines of a model's logic or simply as a "Rate of Return" calculator. Each of the following routines operate with varying time periods; i.e., the model may contain columns that represent months, quarters, years, or multi-year periods.

AMORTIZE — Computes principal and interest for seven loan types. The user may specify balloon payments, lump sum payments, or an initial non-payment period. Varying or constant interest rates can be applied across columns.

ANNUITY — Used to calculate the parameters of a loan, lease, or annuity. Parameters are Principal, Term, Interest Rate, Payment Amounts; also prints Principal Balance and Interest Paid to Date.

DEPRECIATE — Computes depreciation schedules using either straight line, declining balance, or sum-of-the-years digits. The user may also specify whether automatic cross-over from declining to straight line is desired.

DISCOUNT — Computes, in every column, the discounted value of any line of a FORESIGHT model at the discount rate specified by the user.

PRESENT VALUE — Computes a single dollar value for the values in any line of the model. Again, the user specifies the interest rate (cost of capital). Discrete time periods can be handled.

RATE OF RETURN — Calculates the internal rate of return of any line of a model.

SPREAD — Spreads a data value over time at a distribution selected by the user. Useful in spreading accounts payable, accounts receivable, and arriving at expected cash flow from sales or billings.

COMPUTATION AND DATA MANIPULATION ROUTINES — These include the following:

CONSOLIDATION — Consolidations are easily accomplished by the user. Any number of models can be consolidated and merged through the CONSOLMERGE Command. The models may be merged as models, by reports, or by line; e.g., plant reports merged into division, divisions to group, group to corporate. The CONSOLSELECT Command allows the user to selectively extract complete columns of information from one or more models and pass these into any other model. New reports can thus be created — year end results of all subsidiary elements, variance reports (plan vs. actual), contribution of subsidiary reporting units with the corporate total.

The use of the FORMAT option permits the linking (or consolidation) of dissimilar models by allowing the user to pass the calculated results of one or more models into other models for further calculation based on prior results. For example, the results of a production planning model could be passed to a model that calculates the sales, earnings, and cash flows expected at this level of production.

DATAIN/DATAOUT – Provides both an entry and exit capability for the FORESIGHT models. DATAIN is used to pick up data from external files (general ledger, DBMS, corporate files); DATAOUT passes FORESIGHT data values to an external file for subsequent processing.

OUTPUT REPORTING – The output of FORESIGHT is normally directed to a terminal or line printer. The OUTPUT Command can be used to re-direct files to other units; e.g., disk, tape, drum, printer, or card punch. The data may be presented in a number of ways:

MODELING REPORT OPTION – Produces standard report formats as part of the modeling process - report heading, date field, I.D. field, column headings, underlining, spacing, decimals.

VARIABLE REPORT WRITER – For more formal reporting, a comprehensive report writer is included. A number of features are available, including suppression of line numbers, suppression of zero values, percent, comma, and decimals, underlining, selection of lines, columns, comment lines, to mention only a few.

PAGE – This command allows the user to specify the number of print lines for the particular form being used, prints all report titles and headings on each page, selectively spaces reports.

PLOT – Graphical output from (certain) X-Y plotting devices or terminals. The graphs use the data or computed results of a FORESIGHT model; line graphs or bar chart outputs are available.

STATISTICAL FORECASTS – Can be accomplished using the FORECAST Command followed by the type of operation to be performed. The user can work with either historical data which was previously entered into the model or the computed results of the model logic. The new statistical forecast can be placed back into any line and column of the model. The model can then be rerun using statistically created values. Additionally, the user can print the results of the projections, add weights, change data or confidence bounds and reforecast, if desired. The FORECAST functions are:

CURVE FIT – which fits a prescribed curve (straight-line, constant growth, power or learning curve) to a set of data values. The data can represent either seasonal or nonseasonal data values.

PROJECT – extrapolates data values from the trend line selected and places these values into a line of a FORESIGHT model.

SMOOTH – performs single or double exponential smoothing or moving average computations for series of data values.

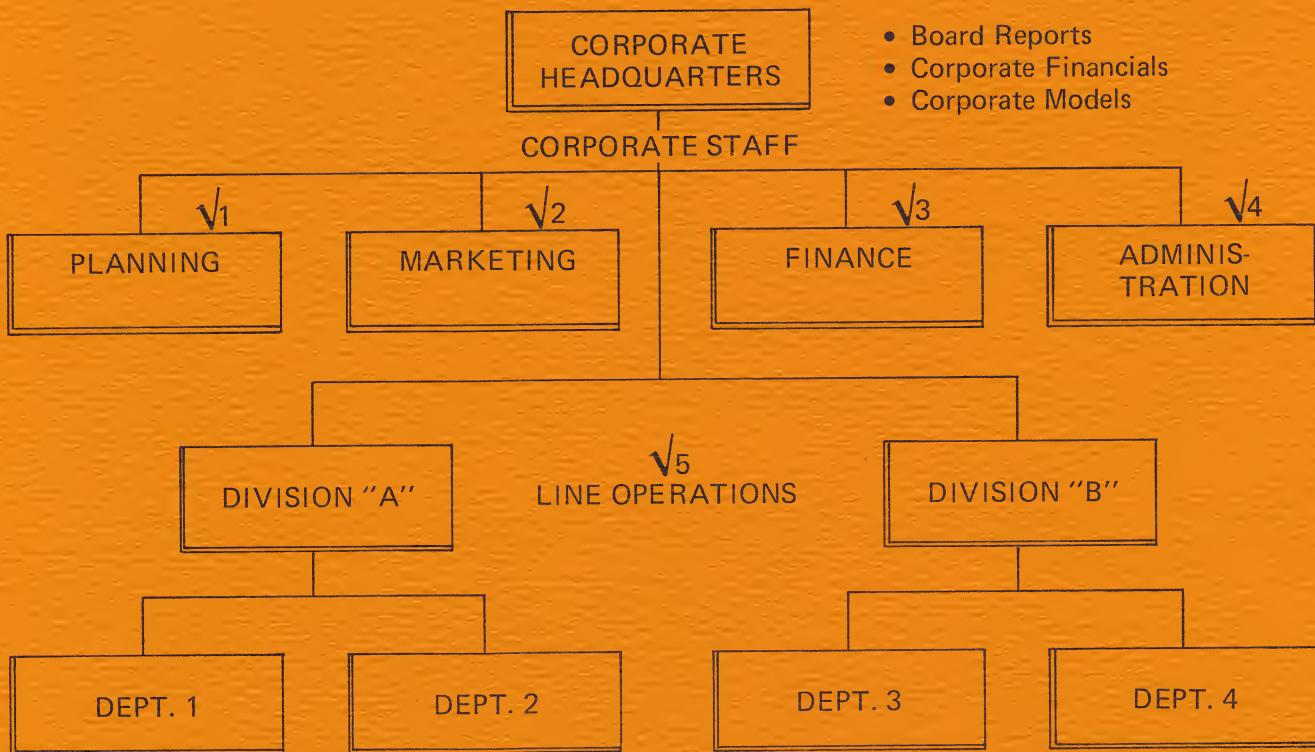
STATISTICS – generates basic statistical information about the values within the model.

MATHEMATICAL AND LOGICAL RELATIONSHIPS – There are a number of mathematical operators that can be used to express relationships between lines and columns of FORESIGHT models. In addition, the logical IF command, and its correlative branching routines make possible iteration, looping, sensitivity analysis, simultaneous problem solving and forward/backward modeling. Some of the mathematical and logical operators are:

+ (Add)	- (Subtract)	IF (Conditional Expression)
x (Multiply)	÷ (Divide)	GE, GT, EQ, NE, LT, LE
MAXIMUM	MINIMUM	(Conditional Relationships)
MORE THAN	LESS THAN	
TRUNCATION	EXPONENTIATION	
SUM LINES _____	THROUGH _____	

AND/OR
THEN } GO TO
ELSE }

THE APPLICATIONS OF FORESIGHT



FORESIGHT is in daily use by many leading corporations, financial institutions, and government agencies in the U.S., Canada, and overseas. Some typical FORESIGHT applications in a corporate environment are:

Planning $\sqrt{1}$

- Automation of Plans and Projections
- Evaluation of Alternative Courses of Action
- Merger and Acquisition Analysis
- New Business Development
- New Product Development

Marketing $\sqrt{2}$

- Sales Analyses
 - by product line
 - by sales area
- Market Share Forecasting
- Bid and Proposal Analysis

Finance $\sqrt{3}$

- Profit Planning
- Budgeting and Consolidation
- Financial Ratio Analysis
- Corporate Financing Studies
- Tax Reporting,
- Compliance and Planning
- Capital Budgeting
- Pro Forma Analyses
- Cash Management
- Asset Management
- Tax Depreciation

Administration $\sqrt{4}$

- Personnel Budgeting,
- Analysis
- Facility Planning
- EDP Cost Analysis
- EDP Cost Allocation

Line Applications $\sqrt{5}$

- Equipment Utilization
- Operating Ratio
- Analysis
- Budgets and Variance Reports
- Conformance to Corporate Plans



IFM

United Computing's Interactive File Manager (IFM) functions as both a file manager and a data base system. While IFM can perform routine file maintenance requirements, it is also capable of handling such sophisticated applications as inventory control, personnel management, and sales and accounting information systems. IFM is the result of United Computing's efforts to meet the informational and data management needs expressed by its clients.

IFM has been designed to give the user a greater degree of control over the system. IFM has a vocabulary of 13 commands. Key word phrases direct the verbs to specific data for action. The procedural commands are:

- HELP provides system-level instruction for commands and key words.
- DEFINE creates and alters the description of a data file.
- SCAN permits a user to examine the fields and records in a file for bad data. Any bad records may be corrected from the terminal.
- SORT will arrange records in ascending or descending sequence according to the designated fields.
- MERGE combines two data files into one. The records may be merged together if the files are sorted on the same fields.
- PRINT selectively displays entire records or portions of them; it is an abbreviated method of obtaining a report. It allows for column and output headings if desired.
- SELECT is a powerful information retrieval command which sifts through input records, selecting only those which meet specified selection criteria. SELECT can use an alternate data file as a control on the records to be selected.
- UPDATE is the most powerful command in the IFM vocabulary; it has the means to alter fields with a full complement of logical and arithmetic expressions. UPDATE can use an alternate data file as a control on the updating.
- RESTORE has the ability to add new records to an existing master file. It will replace those records in which a match is detected between the master file and the restored records file.
- REPORT is capable of generating sophisticated report formats with such features as page and column headings, subtotals, various pagination controls, etc. REPORT actually generates a program in the IFM programming language which may be saved and run by EXECUTE.
- EXECUTE generates the reports from programs written in the programming language. It can also perform updating and scanning as well as report writing.
- PROCEDURE executes a sequence of commands written in the IFM procedure language — a type of IFM command file. PROCEDURE allows the user to designate prompts and set registers to needed values. A procedure file is particularly helpful for repetitive IFM runs.
- MACRO, an advanced IFM feature, allows the user to set up customized IFM commands and key words.



IFM was designed to be highly interactive and it "talks" to the user freely. An extensive prompting capability allows a novice user, with little IFM experience, to use the product with confidence. Unlike many file or data base management systems, IFM data files and IFM description files are created and stored independently. The data files can be created by IFM, by direct entry into the system or by an executing program. The definition of the file must be done in IFM. Once these two steps are taken, all the IFM commands can be utilized. IFM can manage many fixed field or free-field formatted BCD files.

IFM enables a user to:

- Convert raw data on inventories, sales, etc., into a simple ad-hoc report by using the PRINT verb. REPORT does report formatting, subtotaling and pagination. By taking over these report tasks, IFM can help facilitate programmer productivity.
- Expand the potential of the program for the experienced user by defining new IFM commands via the MACRO command.
- Process MINIDATA data base files, enhancing and extending the capabilities of United Computing's MINIDATA database system.
- Develop information systems around a multiple file environment, with each file having the ability to serve as a functional file with an optional use. For example, the output file containing sales forecasts from a forecasting program can form part of a sales management system, eliminating the need for reformatting or loading into a separate data base.

Day-to-day uses of IFM include sorting, file reformatting from free-field to fixed-field records and vice versa, data scanning for illegal values, reporting, file updating and retrieval. These file maintenance and management functions of IFM effectively eliminate the need for small, specially developed programs in FORTRAN, BASIC, COBOL, etc., to accomplish these tasks. As a data base management system utilizing a file structure completely compatible with United Computing's host languages (FORTRAN, EDITOR, BASIC, etc.), IFM offers great flexibility in the design and development of information systems.

IFM is accessible in the time-sharing and remote job entry modes from the over 90 cities across the nation currently serviced by UCS's UNINET communications system. IFM is also available nationally via IN WATS communication facilities in the Remote Batch mode.

For more information on IFM, contact your local United Computing Systems representative.

SYSTEM 2000*

Commercial data base management systems are receiving widespread acceptance and use in the data processing community today. A new system with powerful and flexible retrieval capabilities is attracting the interest and attention of data processing managers worldwide. This system, SYSTEM 2000, is now available on APEX/SL, United Computing Systems' national data services network. The combination of SYSTEM 2000 capabilities with the extensive United Computing communications network and huge central computing facility creates an information processing environment capable of satisfying the most advanced applications requirements. SYSTEM 2000 provides the basis for developing fast and efficient information processing systems of any magnitude tailored to the application and the user. United Computing puts these capabilities at the user's fingertips. SYSTEM 2000 features include a report writer, a user-oriented language providing on-line access to nonprogrammers, and a procedural language interface for programmer use.

Information systems must meet four goals:

- They must respond quickly and effectively to changing information requirements and technology.
- They should be able to satisfy both the standard, predictable information needs and the unpredictable, ad hoc information requests from management.
- The systems must make the best use of the people, hardware, telecommunications and procedures which are its component parts.
- The systems must provide information that is accurate, timely, relevant and complete.

SYSTEM 2000

To meet today's ever-changing, ever-growing information requirements, SYSTEM 2000, a generalized data base management system, has been developed by MRI Systems Corp. With this generalized data base management system, information applications can be designed, installed and operating in days or weeks rather than months or years. Fully programmed, it is flexible and responds quickly to changing information requirements.

Redundant files and nightmarish update procedures are replaced with a single, integrated data base and orderly maintenance functions. To more accurately reflect the complexity of the activities it describes, data bases can be structured in a number of complex ways. Unusual information needs are satisfied immediately and can be performed by nonprogramming personnel. SYSTEM 2000 provides a variety of data manipulation and formating techniques. It can function in both on-line and batch environments. It makes efficient and optimum use of people, procedures and the new data input/output technologies.

*System 2000 is a service mark of MRI Systems Corporation.

AN OVERVIEW

Basic SYSTEM 2000

Basic SYSTEM 2000 provides the user with a comprehensive set of data base management capabilities. These include the abilities to define new data bases, modify the definition of existing data bases, and to retrieve and update values in these data bases.

The basic components of data base definitions are data elements and repeating groups. Values are stored in data elements. Repeating groups describe a structure for storing multiple sets of data values and also serve to link hierarchical levels of the definition.

Values for each element and logical entry (record) may vary in length. The user may specify without restriction which elements in the data base are to be inverted and become key fields, and what hierarchical relationship an element will have with other elements in the data base. Data security is maintained by password control to the data base and additional password control to each component.

Basic SYSTEM 2000 provides archival copies of data bases and records an audit trail of changes made to a data base. It is capable of reconstructing a data base by applying the audit trail, completely or in part, to an archival copy of that data base.

Immediate Access Feature

The Immediate Access Feature provides a user-oriented language with which a nonprogrammer may express his requests for retrieval or updating of a data base. The English-like language is easily learned. It includes a complete set of easy-to-understand diagnostic messages and is highly suited for interactive time-sharing use.

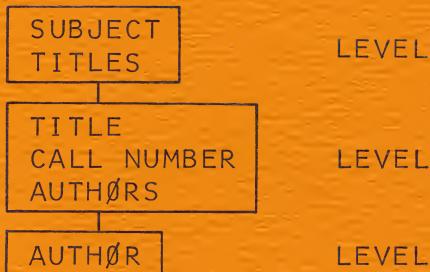
Procedural Language Feature

The Procedural Language Feature enables users to manipulate data in a SYSTEM 2000 data base from COBOL, FORTRAN, or assembly language programs. This feature provides the mechanism for addressing any part of the data base of interest to the procedural program, to retrieve data in a sequence and format suitable for procedural processing, and to update the data base from the program. Interrelationships between two or more data bases can be established which permit network data structures to be defined.

Report Writer Feature

The Report Writer Feature enables the user to prepare report specifications following a set of quickly-learned report formating conventions. The user specifies column, row and page headings, dates and footnote captions. Also specified is the nested blocking of the retrieved data which controls the sequence of the data blocks at the time the report is produced. Other capabilities permit the user to specify format conventions for data fields, and accumulate grand and subtotals for data blocks.

THE DEFINITION PROCESS



LEVEL 0

LEVEL 1

LEVEL 2

USER, PASWØRD:
NEW DATA BASE IS CARD CAT:

1*SUBJECT(NAME):
2*TITLES(REPEATING GRØUP):

3*TITLE(NAME IN 2):
4*CALL NUMBER(DECIMAL IN 2):
5*AUTHØRS(REPEATING GRØUP IN 2):

6*AUTHØR(NAME IN 5):

MAP:

THE RETRIEVAL PROCESS

3*SLEUTH
6*ANTHØNY SHAFFER

PRINT TITLE,AUTHØRS WHERE
SUBJECT EQ MYSTERY:

3*THE SPIRAL STAIRCASE
6*AGATHA CHRISTIE

3*THE DELTA FACTØR
6*MICKEY SPILLANE

THE UPDATE PROCESS

ADD ELEMENTS

ADD TITLE EQ THE WIZARD OF ID* WHERE SUBJECT EQ COMEDY:

CHANGE ELEMENTS

CHANGE AUTHØR EQ BRANDT PARKER* WHERE TITLE EQ THE DELTA FACTØR:

ADD LØGICAL ENTRY (RECORD)

INSERT TREE CØ*1 EQ 1*CØMEDY 2*3*THE WIZARD ØF ID*4*06*5*6*BRANDT
PARKER*6* JØHNNY HART*END*:

REMOVE ELEMENTS

REMOVE AUTHØR WHERE AUTHØR EQ ANTHONY SHAFFER:

REMOVE LØGICAL ENTRY (RECORD)

REMOVE TREE ENTRY WHERE SUBJECT EQ MYSTERY:

THE ANSWER

SYSTEM 2000 is not an abstract technical achievement; its use provides concrete advantages to the user. They include . . .

- The development costs associated with designing and programming a complete in-house data base management system are avoided; SYSTEM 2000 can be used in a multitude of applications and can be fully implemented for a fraction of typical development costs.
- No technical education is required before the user can begin employing the system; SYSTEM 2000's self-contained language and procedural capabilities adapt immediately to the needs and professional backgrounds of the user's personnel.
- Major programming changes are not required as SYSTEM 2000 takes on new user applications. As the size of the data base is increased, or as the application is tailored to the changing needs of the user, SYSTEM 2000's general-purpose design permits system growth to match expanding application boundaries.
- In every application, SYSTEM 2000 increases the user's efficiency in designing and maintaining his data base; the variety of design options available to the user lets him specifically tailor his file organization, storage techniques, reports, access and response characteristics to accomplish the job at hand.
- To achieve processing efficiency and greater economy, SYSTEM 2000 offers inverted index processing.
- The user is not restricted to the use of one or a few elements as access keys; SYSTEM 2000 allows the user to specify as many or as few key elements as he desires.

SYSTEM 2000 is in use today in a wide variety of applications. Current applications include the following:

- Management information systems
- Inventory control
- Order entry systems
- Personnel information systems
- Securities portfolio management
- Project control systems
- Bill of materials processors
- Student educational records
- Ecological studies
- and many others

For more information, contact your local United Computing representative.



INFORM

INFORM is a general purpose data management system. INFORM has been designed to perform the entire range of data processing functions quickly and easily. A few simple English-like commands permit data entry, verification, retrieval, manipulation, sorting and reporting. Offered exclusively by United Computing, INFORM is powerful, flexible and easy to use.

INFORM offers management the following advantages:

- Direct control of information processing.
- Faster progress from applications planning to implementation and operation.
- Programming costs are significantly reduced.
- Easier access to data since non-programmers can make effective use of the computer.

INFORM has been proven effective by time-sharing users for over four years. It is available either in-house on the DEC PDP 11-70 or through United Computing's time-sharing service.

Using INFORM you can create an entire information application. It is an extremely flexible and valuable tool to all types of computer users, from novice to expert. As your expertise grows, INFORM's advanced features respond to your needs. INFORM's statistical analysis features add to its powerful interactive inquiry capability.

Typical INFORM applications include:

- For a limited partnership management company: A general ledger audit system that keeps track of over 60 partnerships, 200 projects, and approximately 175,000 transactions a year.
- For a group health insurance trust: A claims reporting, accounts receivable, commission accounting and premium payments accounting system.
- For a major electric utility: An on-line interactive feeder network that monitors electric power distribution continuously and locates failures.
- For a photographic film manufacturing facility: A quality assurance program that monitors the entire production process from raw materials to finished product and provides detailed and summary data on rejects.
- For a large conglomerate: A system to track complicated overseas shipping.
- For the microelectronics division of a major aircraft manufacturer: A manufacturing information system that is an assembly line locator system, daily production reporting and analysis system and a production scheduling system.
- For the Veterans Administration: A budget planning and tracking system for construction projects.

All of INFORM's commands are in English, making applications easy to develop and change. Once the structure of a database has been defined, it remains intact until you are ready to change it. INFORM can manipulate alphabetics, numerics and dates.

INFORM contains the facilities to solve all phases of the information processing problem:

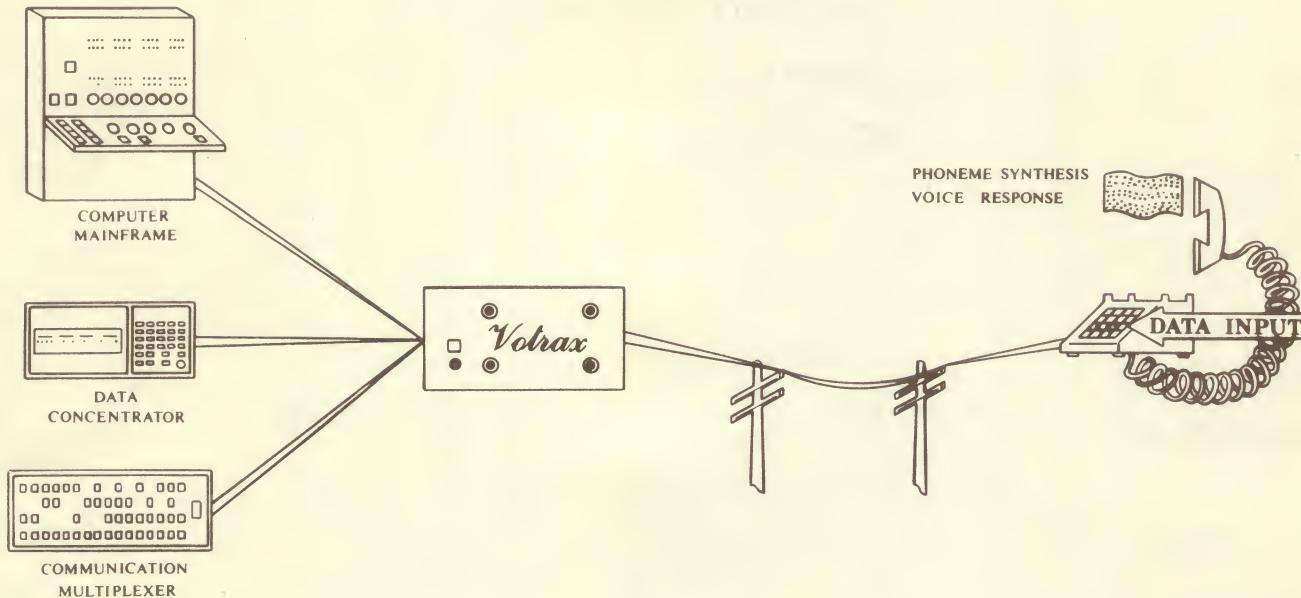
- Database definition and redefinition
- Data entry and validation, file management
- Transaction processing
- Data manipulation and calculation
- Management reporting and ad hoc retrieval
- Data analysis
- Data security

United Computing Systems is a wholly-owned subsidiary of United Telecommunications, Inc. United Telecom has assets in excess of 2.7 billion dollars and is the parent company of the United Telephone System, the nation's second largest independent telephone company. From this solid foundation, United Computing and INFORM assure reliable performance you can count on.

For more information on how INFORM can save you time and money in your business operation, contact INFORM National Sales Manager, United Computing Systems, 2525 Washington, Kansas City, Missouri 64108, telephone 816/221-9700.

Votrax®

ML-I and VS-6 ELECTRONIC VOICE SYSTEM



MAKE ANY TELEPHONE A COMPUTER TERMINAL

The VOTRAX Electronic Voice System is a new departure in voice response technology. Models VS-6 and ML-I are unique phoneme-based systems which combine low cost, unlimited vocabulary, operational simplicity and low data requirements to provide the ultimate in cost effectiveness and flexibility.

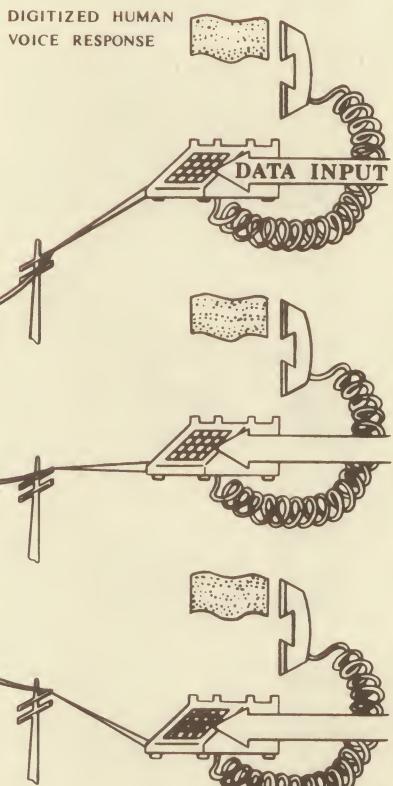
Operationally, VOTRAX appears to the host system as a standard asynchronous, ASCII terminal. Consequently, VOTRAX conforms to existing device support making it compatible with virtually any system. VOTRAX uses phonemes or basic sounds to build words and phrases. These phonemes are stored as strings of standard computer character codes. As a result of this approach, vocabulary may be changed or expanded to easily meet changing application requirements. Only 300 bits per second are required to produce continuous speech. As a result, vocabulary storage requirements are kept to a minimum. The user may program his own vocabulary or depend upon the Vocal Interface Division for vocabulary development.

When your applications require flexible or unlimited vocabulary capability, low unit cost, deployment flexibility, open ended growth potential and solid-state reliability, then the VOTRAX VS-6 and ML-I will meet your needs.

Votrax®

LVM-50 MICROPROCESSOR AUDIO RESPONSE SYSTEM

**MAKES ANY TELEPHONE
A COMPUTER
TERMINAL**



The VOTRAX LVM-50 Audio Response System is a compact, solid-state peripheral system which provides multi-line audio response output and Touch Tone* input handling capabilities. The LVM-50 is revolutionary from a cost standpoint. A system consisting of 16 seconds of stored speech (i.e. 32 words of $\frac{1}{2}$ second duration) multiplexed over 16 phone lines cost less than \$1000 per line. We do it by storing words and phrases in solid-state Read-Only-Memory (PROM) and by multiplexing the voice output with our microprocessor-powered controller.

The LVM-50 attaches to your micro-, mini-, or maxi-computer via a single asynchronous communications adapter for the utmost in hardware and software compatibility.

When your applications require a stored human voice, multiplexing at a low cost per line, solid-state reliability and the flexibility to grow with application requirements, then the LVM-50 is your best bet.

CONTACT:

EAST COAST

Vocal Interface Div.
270 Concord Street
Framingham, Mass. 01701
Phone: (617) 879-3274

MIDWEST

Vocal Interface Div.
500 Stephenson Hwy.
Troy, Mich. 48084
Phone: (313) 588-2050

WEST COAST

Vocal Interface Div.
4340 Campus Drive
Suite 212
Newport Beach CA 92660
Phone: (714) 557-9181

EUROPE

Vocal Interface Div.
Reis-Str. 16
6200 Wiesbaden
Federal Republic
Germany

VOCAL INTERFACE
A Division of Federal Screw Works

*The
Communications
People*

Votrax®

LVM-50 MICROPROCESSOR AUDIO RESPONSE SYSTEM



MULTIPLE-LINE AUDIO RESPONSE SYSTEM

The VOTRAX LVM-50 is a compact, solid-state peripheral system which provides multi-line audio response output and Touch Tone * input handling capabilities for virtually any computer. The LVM-50 utilizes the latest advances in semi-conductor and microprocessor technology to produce a natural, intelligible voice system that is simple to install and both economical and reliable to operate.

The standard LVM-50 can service up to 32 telephone lines by utilizing an on-board microprocessor to multiplex the stored digitized vocabulary on output as well as control all functions of the audio response data sets to decode and convert incoming touch tone signals. Other functions of the microprocessor-powered system controller will be described below.

LOW COST PER LINE

The integration of several recent developments in the electronic industry and our own extensive experience in the field of voice synthesis has permitted us to produce a multi-line system at an unbeatable price. For example, a 16-line, 32-word system may be purchased for under \$1,000 per line! And as the number of lines increases the cost per line decreases. This means that a host of Touch Tone * audio response applications are now economically feasible for business minicomputer users as well as others.

CUSTOM VOCABULARY - ANY VOICE

Vocal Interface has developed a new concept in digitally stored human speech. This unique process utilizes the proprietary VODIS-I computer system to convert analog audio signals into digital bit patterns with heretofore unheard of efficiency. This process permits the use of Programmable Read-Only Memories (PROM) as storage media. Hence, we can offer the customer the words, phrases and even the voice of his own choosing at no additional cost. This approach also has the advantage, through reprogramming, of flexibility to meet changing requirements and applications.

ADVANCED CAPABILITIES

The LVM-50 supports a number of outstanding features. Words and messages may be virtually any length for maximum naturalness and flexibility.

The LVM-50 supports the use of a large number of audio response data sets including the Vocal Interface Audio Response Modem, Bell 407A, 407B and several commercially available 403-type units. It also supports all features and capabilities of the Bell TRANSACTION * TELEPHONE, Automatic Call Distributor and Call Director. These are features normally found only on the most expensive and complex systems.

* Trademark of AT & T Co.

SYSTEM MODULARITY

The LVM-50 System consists of one or more system modules, depending upon the number of telephone lines the system will support. Each module is provided in a compact computer rack mount or free-standing cabinet. The basic systems module is the System Controller which houses the microprocessor, vocabulary and controls for four telephone lines. Additional lines are accommodated by Expansion Units. These modules each control up to eight additional lines and may be added to the System Controller to produce a system of the desired configuration. The photograph depicts the System Controller and a single Expansion Unit which represents a 12-line system.

OPERATIONAL SIMPLICITY

Although the LVM-50 offers tremendous cost and technical advantages it is quite simple to install and operate. This is made possible by the use of microprocessor technology in the System Controller. Because of this built-in intelligence, the System Controller is able to simulate the operation of an asynchronous terminal (RS-232-C) on the host computer's communications adapter (such as the DL11E on the Digital Equipment PDP-11). Also, the LVM-50 controls all functions of the audio response data sets. This allows the host to conduct all operations as if it were communicating with a single terminal in a point to point network arrangement. All transactions are conducted using standard ASCII data (EBCDIC optional) without the need for elaborate support software or special interfacing hardware.

CONTACT:

EAST COAST

Vocal Interface Div.
270 Concord Street
Framingham, Mass. 01701
Phone: (617) 879-3274

MIDWEST

Vocal Interface Div.
500 Stephenson Hwy.
Troy, Mich. 48084
Phone: (313) 588-2050

This approach permits the use of the LVM-50 with just about any computer currently in existence, from microprocessor to giant business mainframe.

SPECIFICATIONS:

Maximum Message Capacity: 256 words or 2 minutes 8 seconds of speech (average word duration is 0.5 seconds).

Maximum Number of Lines: 32

Dimensions:

System Controller - 11-7/8" W x 11-1/2" D x 6-1/2" H
Expansion Unit - 11-7/8" W x 11-1/2" D x 3-1/4" H

Mounting: 19" EIA Horizontal Rack Mount or Stand Alone Cabinet.

Temperature Range: 0° C to + 50° C (+ 32° F to + 125° F)

Output Signal: 0 dbm into a 600 \sim load.

Output Bandwidth: 50 - 3.5 KHz

Electrical: 115 VAC \pm 10 %, 47-420 Hz

Customer Tape Requirements: The user may submit a tape recording of the desired vocabulary which will be used to produce the actual voice output of the LVM-50. 1/4" reel type magnetic tape at 7-1/2 ips. 1/2 track or 1/4 track monophonic on both tracks.

VOCAL INTERFACE

A Division of Federal Screw Works

WEST COAST

Vocal Interface Div.
4340 Campus Drive
Suite 212
Newport Beach, CA 92660
Phone: (714) 557-9181

EUROPE

Vocal Interface Div.
Reis-Str. 16
6200 Wiesbaden
Federal Republic
Germany

*The
Communications
People*

Votrax®

ML-I MULTI-LINGUAL VOICE SYSTEM



- **Multi-Lingual Capability**

The VOTRAX Model ML-I is a unique solid-state device which produces high-quality electronically synthesized speech. This unique system combines low unit cost, unlimited vocabulary, operational simplicity, low data requirements and multi-lingual capability to provide the ultimate in flexibility and cost effectiveness. In addition to excellent English, the ML-I can speak fluent German. Other languages, including Spanish, French, Japanese and Parsi (Persian), are presently under consideration for development as optional languages.

- **Unlimited Vocabulary**

The ML-I is programmed to speak based on phonetic coding principles. Each 12-bit command word selects one of 122 phonemes (sounds), one of eight levels of inflection (pitch) and one of four phoneme rates (duration). Optionally, the command word may be used to alter entire utterances with regard to amplitude (volume) and/or rate. When used in this latter fashion, the command word is referred to as a "Flag" command. Utterances are "spelled" phonetically to produce all combinations of words and phrases required by the application. Since words and phrases are stored in the form of digital information on some storage medium, such as magnetic disc or solid-state memory, there is virtually no limitation as to the amount of vocabulary the ML-I can produce. One well-known computer services company reports a vocabulary in excess of 300,000 words. The value of unlimited vocabulary is that the same VOTRAX unit can be used for any and all applications.

- **Low Data Requirements**

The unique VOTRAX technology permits the production of speech at uniquely low data rates. At twelve data bits per phoneme command, the ML-I can achieve continuous speech from input at less than 300 bps. The result is maximum utilization of communications channels.

- **Operational Simplicity**

The VOTRAX ML-I is designed to be as simple as possible to install and operate. All VOTRAX interfaces are compatible with most conventional computer and communications equipment (EIA Serial and TTL Parallel). In the case of the EIA unit, the interface controls are comparable to the Bell 103 and 202-type modems. Consequently, an asynchronous communications adapter that is compatible with the Bell 103 or 202 will attach to VOTRAX without modification. Since this system operates in the same way as an asynchronous data terminal, any standard ASCII terminal driver software will provide device support for VOTRAX. Data formats are either Serial ASCII or 12-bit Parallel. The user needs to do little more than prepare his application program to start effectively using the ML-I. Consequently, the VOTRAX system becomes productive quickly, easily and with a minimum of expense.

The VOTRAX ML-I was developed to fit into a wide variety of applications and physical environments. A complete range of interface types and options makes VOTRAX compatible with virtually all computers, from the largest business mainframes to the smallest microprocessors. The small amount of data and limited controls required to drive VOTRAX permit installation at almost any point in a communications network: host computer, communications concentrator, communications multiplexor, or computer terminal. Data rates of 110 to 9600 bps also allow the ML-I to fit into existing systems with little or no change. Operating temperature and humidity specifications are such that specially conditioned environments are not required. Applications include: Computer Timesharing, Education, Handicapped Aids, Instrumentation, Manufacturing, Military and Training Simulators.

- **Flexibility**

SPECIFICATIONS

Electrical

Input Power Requirements 115 VAC ±10%,
47-420 Hz, 0.38 Amps
Input Power Fuse 3AG - 1/2 Amp, 125 Volts
Audio Output. 100-5000 Hz, 6 Volts Peak, Nominal
Audio Output Drive Capability 0.5 Watts into an
8 Ohm load

Physical

Stand-Alone Cabinet 11-7/8" W x 11-1/4" D
x 6-1/4" H, 20 Lbs.
19" Horizontal Rack 19" W x 10-1/4" D
x 7" H, 20 Lbs.
Phonetic Keyboard 16-3/16" W x 11-3/4" D
x 4-3/8" H, 13 Lbs.
Speaker 15-1/8" W x 6-3/4" D x 8-1/8" H, 10 Lbs.

Environmental

Operating Temperature. 0° C. to 50° C.
Storage Temperature -20° C. to 70° C.
Operating Humidity 0 to 95% with no condensation

Data Rates (bps)

110, 150, 300, 600, 1200, 2400, 4800, 9600

Interface Types

EIA Serial (RS232C) 403/407-Type Dataset Compatible
Dataswitch (Connects to Asynchronous ASCII Terminal)
FIFO Buffered Parallel (TTL)
FIFO Buffered Vocabulary ROM (TTL)
Keyboard (Connects to Phonetic Keyboard)

Command Word

7-bits: 128 selections available, includes phonemes, pauses
and control functions
3-bits: 8 levels of inflection available
2-bits: 4 rate (duration) selections available

Options

Dataset, 403-Type
Touch Tone* Pad, Acoustically Coupled
Phonetic Keyboard
Vocabulary Development Service
External Amplifier with Tone Control
Customized Interfaces

* Registered Trade Mark of the Bell System

CONTACT:

EAST COAST

Vocal Interface Div.
270 Concord Street
Framingham, Mass. 01701
Phone: (617) 879-3274

MIDWEST

Vocal Interface Div.
500 Stephenson Hwy.
Troy, Mich. 48084
Phone: (313) 588-2050

WEST COAST

Vocal Interface Div.
4340 Campus Drive
Suite 212
Newport Beach, CA 92660
Phone: (714) 557-9181

EUROPE

Vocal Interface Div.
Reis-Str. 16
6200 Wiesbaden
Federal Republic
Germany

VOCAL INTERFACE

A Division of Federal Screw Works

*The
Communications
People*

Votrax®

VS-6 ELECTRONIC VOICE SYSTEM



- **Cost Effectiveness**
- **Unlimited Vocabulary**
- **Low Data Requirements**
- **Operational Simplicity**
- **Flexibility**

The VOTRAX Model VS-6 is a new departure in voice response technology. This unique system combines low unit cost, unlimited vocabulary, operational simplicity and low data requirements to provide the ultimate in flexibility and cost effectiveness. The price of the VS-6 with parallel buffered interface is \$3605 in single-unit quantity. Purchase prices are discounted for quantity buys starting at two units. Maximum discount is over 50%.

The VS-6 is programmed to speak based on phonetic coding principles. Each eight-bit command word selects one of 61 phonemes (sounds) and one of four levels of inflection (pitch). Utterances are "spelled" phonetically to produce all combinations of words and phrases required by the application. Since words and phrases are stored in the form of digital information in some storage medium, such as magnetic disc or solid-state memory, there is virtually no limitation as to the amount of vocabulary VOTRAX can produce. One well-known computer services company reports a vocabulary in excess of 300,000 words. The value of unlimited vocabulary is that the same low-cost VOTRAX unit can be used for any and all applications.

The use of phonetic coding in the VOTRAX VS-6 permits the production of speech at uniquely low data rates. A rule of thumb indicates that the number of phonemes per word is approximately equal to the number of letters per word. At eight data bits per phoneme command, VOTRAX can achieve continuous speech from input as low as 150 bps. The result is maximum utilization of data communications channels.

The VOTRAX VS-6 is designed to be as simple as possible to install and operate. All VOTRAX interfaces are compatible with most conventional computer and communications equipment (EIA Serial and TTL Parallel). In the case of the EIA unit, the interface controls are comparable to the Bell 103 and 202-Type modems. Consequently, an asynchronous communications adapter that is compatible with the Bell 103 or 202 will attach to VOTRAX without modification. Since this system operates in the same way as an asynchronous data terminal, any standard ASCII terminal driver software will provide device support for VOTRAX. Data formats are either serial ASCII or eight-bit parallel. The user needs to do little more than prepare his application program to start effectively using the VS-6. Consequently, the VOTRAX system becomes productive quickly, easily, and with a minimum of expense.

The VOTRAX VS-6 was developed to fit into a wide variety of applications and physical environments. A complete range of interface types and options makes VOTRAX compatible with virtually all computers, from the largest business mainframes to the smallest microprocessors. The small amount of data and limited controls required to drive VOTRAX permit installation at almost any point in a communications network: host computer, communications concentrator, communications multiplexor, or computer terminal. Data rates of 110 to 9600 bps also allow VOTRAX to fit in with a minimum of change to existing systems. Operating temperature and humidity specifications are such that specially conditioned environments are not required. Applications include: Computer Timesharing, Education, Handicapped Aids, Instrumentation, Manufacturing, Military and Training Simulators.

SPECIFICATIONS:

Electrical

Input Power Requirements 115 VAC ±10%,
47-420 Hz, 0.25 Amps
Input Power Fuse 3AG - 1/2 Amp, 125 Volts
Audio Output. 100-5000 Hz, 6 Volts Peak, Nominal
Audio Output Drive Capability 0.5 Watts into an
8 Ohm load

Physical

Stand-Alone Cabinet 11-7/8" W x 11-1/4" D x
3-1/8 H, 11 Lbs.
19" Horizontal Rack 19" W x 10-1/4" D x
3-1/2" H, 11 Lbs.
Portable Case 18" W x 22-1/2" D x 6" H, 20 Lbs.
Phonetic Keyboard 15-3/4" W x 8" D x
3-1/2" H, 6 Lbs.
Speaker 15-1/8" W x 6-3/4" D x
8-1/8" H, 10 Lbs

Environmental

Operating Temperature. 0° C. to 50° C.
Storage Temperature -20° C. to 70° C.
Operating Humidity. 0 to 95% with no condensation

Data Rates (bps)

110, 150, 300, 600, 1200, 2400, 4800, 9600

Interface Types

EIA Serial (RS232C) 403-Type Dataset Compatible
EIA Serial (RS232C) 407-Type Dataset Compatible
Dataswitch (Connects to Asynchronous ASCII Terminal)
Buffered Parallel (TTL, Shift Register)
Unbuffered Parallel (TTL)
FIFO Buffered Parallel (TTL)
FIFO Buffered Vocabulary ROM (TTL)
Keyboard (Connects to Phonetic keyboard)

Command Word

6-bits: 64 selections available, includes phonemes, pauses
and control functions
2-bits: 4 levels of inflection available

Options

Dataset, 403-Type
Touch Tone* Pad, Acoustically Coupled
External Pitch Adjustment
Phonetic Keyboard
Vocabulary Development Service
External Amplifier with Tone Control
Customized Interfaces

* Registered Trademark of the Bell System

CONTACT:

EAST COAST

Vocal Interface Div.
270 Concord Street
Framingham, Mass. 01701
Phone: (617) 879-3274

MIDWEST

Vocal Interface Div.
500 Stephenson Hwy.
Troy, Mich. 48084
Phone: (313) 588-2050

WEST COAST

Vocal Interface Div.
4340 Campus Drive
Suite 212
Newport Beach, CA 92660
Phone: (714) 557-9181

EUROPE

Vocal Interface Div.
Reis-Str. 16
6200 Wiesbaden
Federal Republic
Germany

VOCAL INTERFACE

A Division of Federal Screw Works

*The
Communications
People*



Applied Magnetics
Trendata

Model 4740 Data Communication Terminal

The Model 4740 Data Communication Terminal is a fully-buffered (Transmit & Receive), multipoint, hardcopy terminal that is plug-to-plug compatible with the IBM 2740 Mod II in terms of line protocol and communication codes.

The standard 4740 is also equipped with a host of upward enhancements permitting the terminal to be utilized in a wide variety of general purpose or special applications.

Your operators will like the terminal work station, because it was designed to help them work efficiently. Control keys are grouped conveniently close at hand, yet they don't interfere with typing. The keyboard, "N"-key rollover, and two-key lockout, number pad, and operator-programmable keys were designed for fast, error-free data entry. Almost anyone who has used a normal office typewriter or another type of terminal can operate the Trendata terminal after only a few hours of instruction. The attractive work station will complement any office, and the terminal's quiet operation won't disturb other workers.

Microprocessor-based architecture and an electronic keyboard with few mechanical parts make the Trendata terminal inherently reliable. If a problem does occur, a built-in diagnostic routine isolates the malfunction. When repairs are needed, they can be made quickly by replacing plug-in electronic modules on a swing-out panel, so down-time is kept to a minimum.

The daisy-wheel printer gives superb print quality for the original and up to five copies. Interchangeable type fonts and selectable 10- or 12-pitch printing add to the versatility of the machine. Line length is 132 columns (10 pitch) or 158 columns (12 pitch). Print speed up to 45 cps, and transmission rates are selectable up to 1800 baud.

Options include forms tractors, additional printer controls, and many more.

Features:

- 10 Switch selectable baud rates from 75-1800 baud
- 9 Switch selectable buffer sizes from 120-1536 characters
- Vertical Redundancy Check (VRC) to assure character by character integrity.
- Electronic 45 cps hardcopy printer
- Electronic Control Logic featuring the most recent developments in microprocessor technology.
- Editing feature which allows operator to monitor and change the entered message prior to transmission.
- Electronic control of margins, tab stops, variable escapement, horizontal and vertical spacing by Host Computer or operator key sequence.





Applied Magnetics Trendata

610 Palomar Avenue, P.O. Box 5060
Sunnyvale, CA 94086
(408) 732-1790

Communications

Type Character asynchronous, crystal controlled.

Speed Up to 1800 baud.

Mode Full or half-duplex.

Parity Odd.

Interface EIA RS-232-C

Character Structure EBCD.

Keyboard

Type Electronic; "N"-key rollover with two-key lockout; half-line spacing. Upper and lower case.

Coding Generates EBCD character sets.

Finger pressure Typing keys register with 2 oz. (56.7 gr) of pressure; control keys with 4 oz. (113.4 gr).

Repeat keys Space bar, index (line feed), underscore/hyphen, backspace, letter "X". All typing keys repeat when REPEAT key is pressed.

Numeric entry 10-key numeric pad with minus sign, and carrier return.

Printer

Type Daisy-wheel impact. Produces sharp original and up to 5 crisp copies. **Printing speed** up to 45 characters per second.

Type fonts Large choice of interchangeable type styles.

Line length Choice of 132 (10 pitch) or 158 (12 pitch) columns, switchable.

EBCD characters 96 printable.

Tab, horizontal 132 or 158 positions.

Paper Pin-feed, form, or sheet; widths to standard computer size, 14 $\frac{7}{8}$ in. (37.8 cm).

Ribbon cartridge Continuous ink, cloth or one-pass carbon. Red/black cloth ribbon.

Model 4740 Data Communication Terminal

Workstation

Design Attractive furniture-style desk with 17- x 26-in. (43.2- x 66-cm) work surface.

Control accessibility All controls easily reached from sitting position.

Indicators Non-glare indicator lamps advise operator of system status.

Environmental conditions

Temperature 50 °F to 120 °F (10 °C to 49 °.).

Humidity Relative humidity 95%, non-condensing.

Dimensions

Height 28 in. (71.1 cm), depth 26 in. (66 cm), length 43.5 in. (110.5 cm).

Power requirements

110 VAC ±10%, 60 Hz ±10%, 300 W.

Specifications subject to change without notice.

Specifications

Options

Platens

Pin-Feed Platen 13 $\frac{1}{8}$ "

Pin-Feed Platen 14 $\frac{3}{8}$ "

Pin-Feed Platen 14 $\frac{1}{2}$ "

Dual Cam Pin-Feed 14 $\frac{3}{8}$ "

Dual Cam Pin-Feed 14 $\frac{1}{2}$ "

Split Platen, Pressure Driven

Split Platen, Pin-Feed Driven

Security Lock—prevents unauthorized personnel from using the terminal.

Program w/Preset Tabs—Customer selected tab stops permanently programmed into Read-Only-Memory.

Internal 202 Modem—Operates up to 1800 baud

Red/Black Ribbon—Permits operator selection of Red or Black ribbon.

Forms Tractor—Variable width to handle form up to 15" wide

Auto New Line—Causes terminal to perform CR, line feed when right margin is reached.

Trendata terminals, peripherals, devices, accessories and services are designed for people.



Model 4000A/4741 Full-Feature Terminals



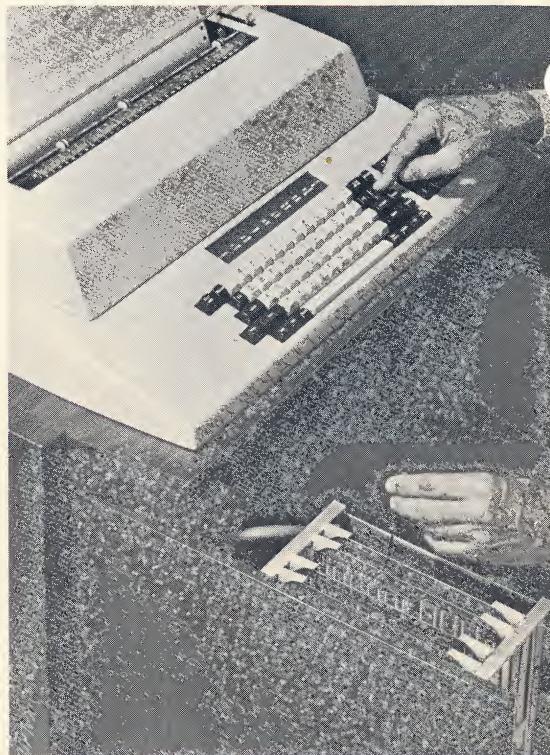
Here are two terminals that give you an outstanding range of standard features for maximum production with accuracy, reliability, and superb print quality. Model 4000A is a full-duplex ASCII terminal with typewriter style keyboard as standard. Model 4741 is a half-duplex, EBCD terminal with Correspondence legend standard. Both offer optional dual-mode operation that lets the operator switch between two keyboard styles or line disciplines for different applications.

The daisy-wheel printer gives superb print quality for the original and up to five copies. Interchangeable type fronts and selectable 10 or 12 pitch add to the versatility of the machine. Line length is 132 columns (10 pitch) or 158 columns (12 pitch). Print speeds are selectable up to 30 cps, and transmission rates are selectable up to 300 baud. Typewriter-style keyboard and 14-key numeric pad are standard.

With their electronic keyboards and few mechanical parts, these terminals are inherently reliable. Built-in fault location mode and plug-in modular construction allow fast diagnosis and repair.

Options include forms tractors, additional printer controls, unattended operation feature, various keyboard legends and code sets, workstation features, and

Service



We've built our terminals to be as reliable and trouble-free as possible, but when you do need service, our own factory-trained serviceman will be there.

When the serviceman gets there, he'll be able to find the problem and fix it fast, because your Trendata terminal is designed for serviceability. Built-in diagnostic routines help the serviceman find the trouble. Electronics cards are located on a swing-out door, so they're readily accessible for troubleshooting and replacement.

We can't quite guarantee that your terminal will never need servicing, but we can guarantee that when it does, we'll get it running right again in a matter of hours.

TRENDATA DATA COMMUNICATION TERMINALS



**Applied Magnetics
Trendata**

610 Palomar Avenue, P.O. Box 5060
Sunnyvale, CA 94086

TRENDwriter Capability with Economy



The Trendata TRENDwriter is a compact, economical data communications terminal for on-line or local operation. This 30-cps machine features a highly reliable 7 x 7 dot matrix printer that produces excellent print quality with both upper and lower-case ASCII characters. Horizontal spacing is 10 characters per inch up to a full line length of 132 characters. The standard forms tractor (with vernier adjustment) handles forms from 3 inches to 14½ inches wide and keeps multi-part forms (up to 6 parts) in perfect alignment.

The basic TRENDwriter comes complete with keyboard, printer, and attractive pedestal; ASCII communications; TTY interface; half- and full-duplex operation; and switch-selectable speeds of 10, 15, and 30 cps. Transmission rate is switch-selectable 110, 150, or 300 baud.

A wide range of options include a 14-key numeric pad, APL/ASCII dual-character keyboard, sophisticated forms handling features, and others. Tape cassette, paper tape and tab card peripherals can be attached for off-line data preparation and on-line send and receive.

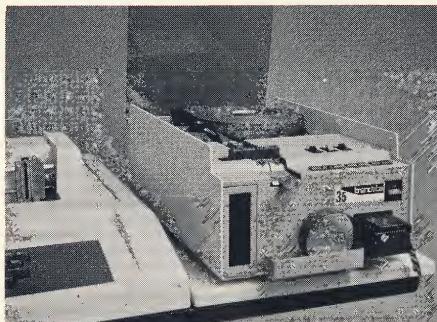
Tape Cassette Recorder



You can prepare data off-line, store non-dynamic data, and maintain back-up files with the Model 4000 Tape Cassette Recorder. This compact unit fits easily alongside your Trendata Terminal. The few simple controls are located on the front panel for easy operation, or the unit can be controlled entirely by the terminal or host computer.

ASCII data can be read at 10, 15, 30 characters per second (110, 150, 300 baud). Binary data can also be read at 1200 baud. Data on the tape can be selectively erased or edited.

Paper Tape Reader/Punch



Read and punch tape on-line or off-line at 110 or 300 baud with the compact Model 35 Paper Tape Reader/Punch, designed for use with the TRENDwriter and Model 4000 terminals. The unit will read rolled or folded tape, and it will punch any tape from paper to Mylar laminates.

The Model 35 operates on-line in either half or full-duplex modes. All controls for the whisper-quiet unit are easy to reach. To make the job even simpler, the Model 35 can be run under remote control for both punching and reading.

Card Reader



Attach the table-top Model 30 Card Reader to your Trendata terminal and you can read 80-column cards, in any format, at 300 cards per minute. Front-loading hoppers will handle up to 500 cards at a time. Simple, three-button control makes the reader easy to use.

Data is read continuously, column by column, and converted to logic levels as it is read. It is presented on 12 parallel output lines. The unit features automatically varied pick duration, and it will make up to three attempts to pick a card. The mechanism loosens and separates heavily packed cards.

Options include reading speeds up to 500 cards per minute, switchable N, 51-, or 80-column reading, and others.

Supplies and Accessories



Trendata is the full-service company that supplies you with everything you need for reliable operation of your terminal. Our full line of accessories includes type elements, ribbons, cassettes and acoustic cabinets.



Applied Magnetics
Trendata

Model 4000A & 4741 Data Communication Terminals

Trendata's Model 4000A and 4741 terminals are designed to meet all of the data communication needs of a modern business, and to serve as high-quality printers as well.

Model 4000A is a full-duplex terminal with ANSI keyboard legend standard. Model 4741 is a half-duplex terminal with Correspondence legend standard. Both offer optional dual-mode operation that lets the operator switch between two keyboard styles or line disciplines for different applications.

Your operators will like the terminal work station, because it was designed to help them work efficiently. Control keys are grouped conveniently close at hand, yet they don't interfere with typing. The standard typewriter keyboard (with tactile feedback, "N"-key rollover, and two-key lockout), number pad, and operator-programmable keys were designed for fast, error-free data entry. Almost anyone who has used a normal office typewriter or another type of terminal can operate the Trendata terminal after only a few hours of instruction. The attractive workstation will complement any office, and the terminal's quiet operation won't disturb other workers.

Microprocessor-based architecture and an electronic keyboard with few mechanical parts make the Trendata terminal inherently reliable. If a problem does occur, a built-in diagnostic routine isolates the malfunction. When repairs are needed, they can be made quickly by replacing plug-in electronic modules on a swing-out panel, so down-time is kept to a minimum.

The daisy-wheel printer gives superb print quality for the original and up to five copies. Interchangeable type fonts and selectable 10- or 12-pitch printing add to the versatility of the machine. Line length is 132 columns (10 pitch) or 158 columns (12 pitch). Print speed up to 30 cps, and transmission rates are selectable up to 300 baud.

Options include forms tractors, additional printer controls, unattended operation feature, various keyboard legends, additional workstation features, and many more.





Applied Magnetics Trendata

610 Palomar Avenue, P.O. Box 5060
Sunnyvale, CA 94086
(408) 732-1790

Communications

Type Character asynchronous, crystal controlled.

Speed Up to 300 baud.

Mode Full duplex (4741: half duplex)

Parity Odd, even, or none (4741: odd only)

Interface EIA RS-232-C

Character Structure USASCII (4741: Correspondence, EBCD)

Keyboard

Type Electronic, with tactile and audible indication of registration; "N"-key roll-over with two-key lockout; half-line spacing. Four legend styles are available. Upper and lower case.

Coding Generates full ASCII, Correspondence, or EBCD character sets.

Finger pressure Typing keys register with 2 oz. (56.7 gr) of pressure; control keys with 4 oz. (113.4 gr).

Repeat keys Space bar, index (line feed), underscore/hyphen, backspace, reverse index, letter "X". All typing keys repeat when REPEAT key is depressed.

Numeric entry 10-key numeric pad with two-station programmable data field delimiter key, decimal point, minus sign, and carrier return.

Printer

Type Daisy-wheel impact. Produces sharp original and up to 5 crisp copies.

Printing speed 30 characters per second.

Type fonts Large choice of interchangeable type styles.

Line length Choice of 132 (10 pitch) or 158 (12 pitch) columns, switchable.

ASCII characters 94 printable.

Tab, horizontal 132 or 158 positions, optional.

Paper Pin-fed, form, or sheet; widths to standard computer size, 14 $\frac{1}{2}$ in. (37.8 cm).

Ribbon cartridge Continuous ink, cloth or one-pass carbon. Red/black cloth ribbon.

Buffering Minimum delays required for carrier return, line feed, tab, or form feed.

Workstation

Design Attractive furniture-style desk with 17- x 26-in. (43.2- x 66-cm) work surface.

Control accessibility All controls easily reached from sitting position.

Indicators Non-glare indicator lamps advise operator of system status.

Model 4000A & 4741 Data Communication Terminals

C.E. mode

Maintenance aid Enables customer engineer to isolate system malfunctions down to module level. Facilitates machine exercising for preventive maintenance and isolation of intermittent conditions.

Environmental conditions

Temperature 50 °F to 120 °F (10 °C to 49 °C).

Humidity Relative humidity 95%, non-condensing.

Dimensions

Height 28 in. (71.1 cm), depth 26 in. (66 cm), length 43.5 in. (110.5 cm).

Power requirements

110 VAC ±10%, 60 Hz ±10%, 300 W.

Specifications subject to change without notice.

Specifications

Options

Modems 113A originate only; 103A originate/answer; leased-line adapter (LLA); acoustic coupler; limited-distance adaptor type 2 (LDA-2).

Communications 20 or 60 ma telegraph interface; CCITT interface; unattended operation; answerback (4000A only); upper-case alpha (4000A only); switchable mode.

Printer Tab back; express backspace; non-standard new line (4000A only); red/black ribbon; plot mode; extended memory; paper-out switch; reverse index; pin-feed platens; forms tractor; friction platen.

Keyboard ANSI, EBCD, APL, or Correspondence keycap legends. (ANSI available on 4000A only.)

Workstation Copy holder; storage drawer; forms stacker; mobile work station.

Miscellaneous Tape cassette recorder tab card reader and paper tape reader/punch; various initialization conditions; switchable baud rates; plot support package and many others.

Trendata terminals, peripherals, devices, accessories and services are designed for people.



INTRODUCTION

CompuServe effectively applies the strong capabilities of both its personnel and its computing systems to the country's needs for information processing. High-quality applications products designed to help business solve problems, coupled with an extensive communications network, advanced system software, a specialized data center, and highly qualified personnel enable the company to attract as customers the largest corporations in the nation.

CompuServe's national recognition and continuing success can be attributed to its customer service objectives which are to:

- enable each network user to implement effective information processing through remote computing
- provide information processing with the highest quality possible
- emphasize technical customer assistance including contract programming and turnkey network facilities
- provide cost-effective, problem-solving products

HARDWARE

CompuServe's mainframe computer hardware consists of Digital Equipment Corporation (DEC) PDP-10, PDP-11, and PDP-15 systems. Management believes that this equipment is the finest and most cost-effective hardware manufactured specifically for remote computing. In addition, CompuServe hardware is:

- protected by two 250kVa Uninterrupted Power Supply (UPS) systems which:
 - filter utility energy to provide constant and consistent power to the computer center
 - provide emergency power to the computer center for up to 30 minutes in the event of a utility energy loss
- supported by an in-house team of top hardware specialists

COMPUTERS

- DEC PDP-10 Time-Sharing Systems which feature:
 - Core capabilities of:
 - 256K to 512K 36-bit words
 - 1.0 microsecond memory cycle time
 - Fixed Head Drums:
 - 1.65 million characters per drum
 - 8 millisecond average access time

—Disk Pack Drives:

- 25, 50, and 175 million characters per pack
- 200-1400 million characters per system
- 28-40 millisecond average access time

- PDP-15 Communications Control Processors
- PDP-11 Network Processors

COMPU-STATION 11

CompuServe recently developed and introduced a piece of equipment known as Compu-Station 11 (CS-11) which can be installed either in one of CompuServe's regional service centers or in a customer's own place of business. The user communicates directly with the Compu-Station 11 which in turn communicates with the main computers in Columbus, Ohio. Thus, the CS-11 unit provides:

- faster, more reliable data transmission through:
 - local echoing
 - automatic retransmission on error and/or carrier loss
- immediate high-speed printouts of material in remote locations

The Compu-Station 11 unit consists of:

- PDP-11 Remote Network Processor (concentrator)
- line printer
 - up to 600 LPM
- card reader
- optional magnetic tape unit

PERIPHERALS

CompuServe provides customers with a variety of peripheral devices for more efficient and specialized use of the computer facility:

- DECtape units
 - 300,000 characters per tape
 - 4.5 kilocycle transfer rate
- magnetic tape units
 - 7 and 9 track
 - 200, 556, 800, and 1600 BPI
- paper tape units
 - 50 CPS punches (8 levels)
 - 300 CPS readers (6 and 8 level)
- line printers
 - 64 character set, 132 CPL, 1250 LPM
 - 96 character set, 160 CPL, 600-1500 LPM
- graphics
 - CalComp Model 748 Flatbed Plotter
 - CalComp Model 1036 Drum Plotter
 - CalComp Model 942 Digitizer

- card readers
 - 026, 029, and image code
 - up to 1000 CPM
- Digi-Data System 30 MT/ST cartridge converter

SOFTWARE

CompuServe's software products are developed by the company's product planning and development group. CompuServe's current software library contains more than 75 programs for use in many different areas. The five largest industrial areas presently served by CompuServe are:

- mining
- government
- insurance
- service
- chemical

In addition, a wide variety of programming languages are offered including the most widely used language:

- FORTRAN
- BASIC
- COBOL

and special languages:

- MACRO (DEC PDP-10 assembler)
- PALX8 (PDP-8 assembler)
- PALX11 (PDP-11 assembler)
- INTEL4 (Zeno INTEL 4004 and 4040 cross-assembler)
- INTEL8 (Zeno INTEL 8008 and 8080 cross-assembler)
- M6800 (Zeno Motorola M6800 cross-assembler)
- ALGOL
- LISP
- SNOBOL/FASBOL (string language interpreter/compiler)
- BLISS (system implementation language)
- AID

In the future, CompuServe will continue to focus its primary marketing strategy on application products. This approach is particularly appropriate to larger organizations, which need computerized problem-solving assistance in specific areas of operations and which form the greatest potential market for a firm with CompuServe's overall capacity, capability, and productivity.

CompuServe offers services in such areas as:

- financial analysis and forecasting
- research and development
- accounting
- investment analysis
- marketing analysis
- inventory control
- project management
- data base management
- mathematics and statistics
- engineering
- graphics

NETWORK

A nationwide network of marketing offices and sophisticated communications equipment enables customers to access the CompuServe system from anywhere in the continental United States either through our own communications network or through inbound WATS lines.

Sales and Service Facilities:

Akron, Ohio
Atlanta, Georgia
Chicago, Illinois
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
Dallas, Texas
Dayton, Ohio
Detroit, Michigan
Houston, Texas
Indianapolis, Indiana
Los Angeles, California
Louisville, Kentucky
Memphis, Tennessee
Miami, Florida
New York, New York
Palo Alto, California
Philadelphia, Pennsylvania
Pittsburgh, Pennsylvania
San Francisco, California
Stamford, Connecticut
St. Louis, Missouri
Tucson, Arizona
Washington D.C.
West Caldwell, New Jersey

Corporate Offices:

5000 Arlington Centre Boulevard
Columbus, Ohio 43220
Telephone 614-457-8600

CompuServe

graphics

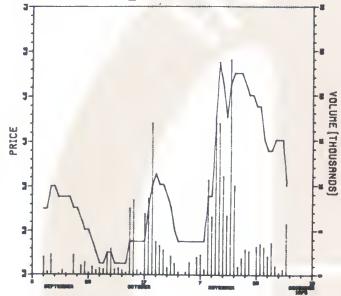
GRAPHS provide a highly effective method for highlighting trends, summarizing a situation, or dramatizing a report or presentation. Rapidata provides a powerful, easy-to-use system for preparing high-quality graphs for a wide range of applications that include:

- Financial Projections
- Performance Analysis
- Market Planning

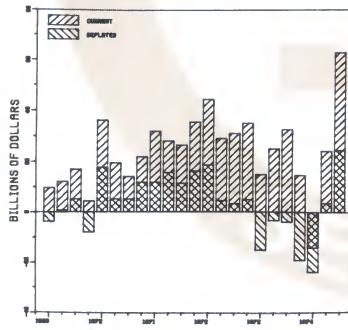
- Statistical Analysis
- Sales Forecasting
- Econometrics

GRAPHS such as these can be prepared quickly and economically, even by people without previous experience in working with computers.

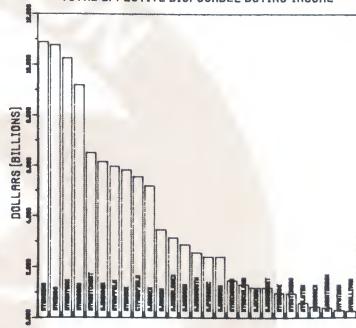
rapidata



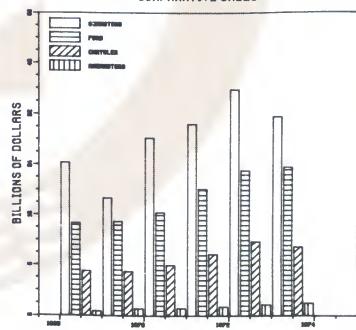
GROSS NATIONAL PRODUCT
QUARTER-TO-QUARTER CHANGE



NEW YORK AREA
TOTAL EFFECTIVE DISPOSABLE BUYING INCOME



U.S. AUTOMOTIVE INDUSTRY
COMPARATIVE SALES



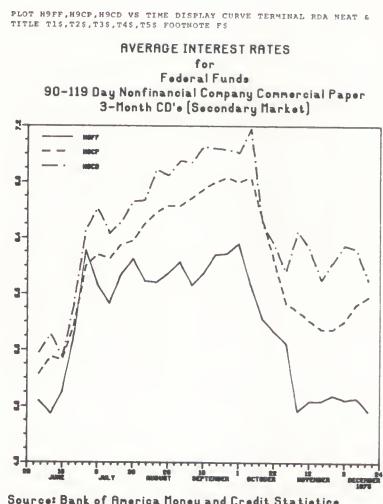
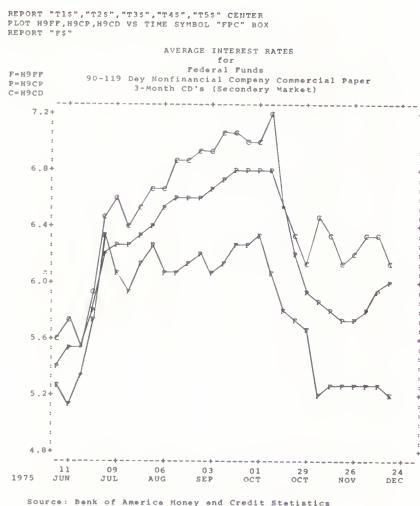
GRAPHS in many instances are only part of a larger application. For example, the last step in a forecasting or analytical application frequently includes a graphic display of the final results. In order to address this type of application, Rapidata's graphics capabilities are closely integrated with its unique PROBE system for data base management, forecasting and statistical analysis, and report preparation. In addition to providing sophisticated techniques for economically managing user data, PROBE also offers direct access to almost 200,000 time series available in a variety of commercial data bases; the graphs shown illustrate the scope of these data bases.

rapidata®

Rapidata's **GRAPHICS** capabilities include:

- High-quality graphs on standard terminals, remote-access Rapidata plotters, and a growing variety of user plotting terminals
- Specification of each graph using a single self-explanatory command, with multi-level defaults
- A wide variety of display modes - symbols, connected symbols, curves, histograms, spikes, and stacked or overlaid bars
- Data of different periodicities (daily, weekly, monthly, quarterly, or annual) on the same graph
- Single or multiple linear, semi-log, or logarithmic axes
- Automatic or user-specified scaling for numeric axes, and automatic scaling of date axes with true calendar accuracy
- User control of plot frames and grids
- User-specifiable graph titles, footnotes, legends, and axis labels, using variable size and quality upper or lower case lettering and user-defined symbols

Rapidata's **GRAPHICS** capabilities can be used to 'fine-tune' graphs to be produced on a Rapidata plotter without the need for an in-house plotting terminal. For example, a graph can be displayed on a standard terminal to check data accuracy, axis scaling, etc. After all the necessary adjustments are made, the same graph can be reproduced on a high-resolution Rapidata plotter, as illustrated by the following examples; to show the simplicity of the language, the commands which produced each graph are also included.



For further information on **GRAPHICS** call the nearest Rapidata office.

CORPORATE HEADQUARTERS: 20 New Dutch Lane
Fairfield, New Jersey 07006 (201) 227-0035

ATLANTA
BOSTON
CHICAGO
FAIRFIELD
MIAMI
LONG ISLAND
LOS ANGELES

(404) 522-1750
(617) 227-4554
(312) 782-9588
(201) 227-5950
(305) 467-2609
(516) 427-7788
(213) 380-3373

NEWPORT BEACH
NEW YORK CITY
PALO ALTO
PHILADELPHIA
SAN FRANCISCO
STAMFORD
WASHINGTON, D.C.

(714) 833-1852
(212) 594-0120
(415) 493-1351
(215) 561-3122
(415) 989-0640
(203) 325-4338
(301) 589-2437

RAPIDATA INTERNATIONAL LTD.
London, U.K. 01-935 8355

REPRESENTATIVE
Pittsburgh National Bank (412) 355-2861

probe

PROBE is a generalized data management and analysis system with a wide range of built-in forecasting, reporting, and plotting capabilities. At over 300 client installations, PROBE is used to manage all types of business, financial, and statistical data alone or in conjunction with over five million data items in a variety of public data bases.

PROBE is a new approach to on-line problem solving. It is a comprehensive language, with an extensive set of analytical capabilities, that provides an environment for developing and controlling problem solutions.

PROBE users are currently addressing some of the following applications:

- Data Analysis
- Financial Analysis
- Forecasting
- Engineering Computations
- Simulation
- Market Research
- Data Reduction
- Econometric Analysis and Model Building
- General Statistical Analysis

PROBE is an extremely sophisticated tool designed to be used for time series and cross-sectional analysis by managers, econometricians, and other 'end-users' of analytical results. The command language is clear, concise, and easy to use. Extensive error correction, default override, and data management capabilities within the language insure complete control of analysis with minimum effort by the user.

PROBE's unique capabilities include:

- Data base capabilities that meet a user's exact needs, from single-series files to large-scale, random access data bases, plus direct retrieval into PROBE from structured (hierarchical) files based on DBMS-10, Digital Equipment Corporation's Data Base Management System developed by Rapidata.
- A full range of arithmetic, functional, and series adjustment (interpolation, sorting, etc.) capabilities.
- A growing library of built-in forecasting techniques, including Box-Jenkins, Winters, adaptive smoothing, X11, and spectral analysis.
- A full range of regression commands, including simple, multiple, step-wise, polynomial, Hildreth-Lu, Almon, and linear, exponential, quadratic, and hyperbolic curve fits.
- Recursive and simultaneous simulation using the Gauss-Seidel techniques.
- Extensive capabilities for producing presentation-quality graphical and tabular reports of PROBE data. Graphs can be prepared on a standard terminal, a plotting terminal (DTC, Zeta, etc.), or a Rapidata plotter.
- Complete control of analysis operations, including programming commands (subroutines, branching, loops, and command files), plus user control over command default options and file and terminal input and output.
- Extensive professional software and field support at every Rapidata office, in addition to extensive reference documentation, user's guides, and regularly scheduled seminars.

For additional information about PROBE and Rapidata's data management, analysis, reporting, and plotting capabilities, contact the nearest Rapidata office.

CORPORATE HEADQUARTERS: 20 New Dutch Lane
Fairfield, New Jersey 07006 (201) 227-0035

ATLANTA, GA	(404) 522-1750	NEWPORT BEACH, CA	(714) 833-1852
BOSTON, MA	(617) 227-4554	NEW YORK, NY	(212) 594-0120
CHICAGO, IL	(312) 782-9588	PALO ALTO, CA	(415) 493-1351
FAIRFIELD, NJ	(201) 227-5950	PHILADELPHIA, PA	(215) 561-3122
HALLANDALE, FL	(305) 467-2609	SAN FRANCISCO, CA	(415) 989-0640
LONG ISLAND, NY	(516) 427-7788	STAMFORD, CT	(203) 325-4338
LOS ANGELES, CA	(213) 380-3373	WASHINGTON, DC	(301) 589-2437

RAPIDATA INTERNATIONAL LTD.
London, UK 01-935 8355

REPRESENTATIVE
Pittsburgh National Bank (412) 355-2861

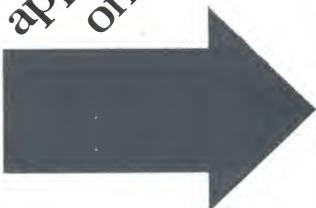
We've got enough products to solve most of your timesharing needs.

The literature available on our products would fill an entire book. But your binder wouldn't hold that much, and chances are you don't want to read it all anyway. So let us know what your information management challenges are. Then we'll send

you information on how we can help you find a computing solution.

You might also like to discover ADP/Onsite, an innovative service alternative pioneered by ADP Network Services. The ADP/Onsite™ Service places a full-scale time-sharing computer on your premises, which is directly accessible to remote users through the ADP Network. Excellent software, extensive data bases and thorough applications support are available through the ADP/Onsite service, as well as through ADP's traditional remote computing service.

Just mark the appropriate boxes on one of the cards



...and we'll speed some interesting and worthwhile reading your way.



175 Jackson Plaza
Ann Arbor, Michigan 48106
313/769-6800



Network Services

please send me information on:

CORPORATE FINANCE

- Financial Modeling Language (FML)
- Investment Analysis (FINALYST)
- Cash Management

BUSINESS ANALYSIS

- Time Series Analysis & Modeling (TSAM)
- Cross Tabulations—Matrix Analysis (XCALABER & SPSS)

INFORMATION MANAGEMENT

- Data Base Management (IPL)
- Custom Applications
- Chemical Substance Management (Chem-Com)
- Graphics

PROJECT MANAGEMENT

- ADP's Project Evaluation and Control System (APECS)

DATA BASES

- Economics—Citibase
- Currency Exchange—ContiCurrency
- Demographics
- Marketing Research
- Corporate Financial Reports—Compustat
- Stock Prices—Fastock
- Banking reports—BANCALL
- Industry Specific
- Energy/Utility
- Raw Materials, Natural Resources
- Transportation

- Also please send information on the new ADP/Onsite Service

Name _____ Title _____ Phone _____ Ext. _____
Company _____
Street _____
City _____ State _____ Zip _____



Network Services

please send me information on:

CORPORATE FINANCE

- Financial Modeling Language (FML)
- Investment Analysis (FINALYST)
- Cash Management

BUSINESS ANALYSIS

- Time Series Analysis & Modeling (TSAM)
- Cross Tabulations—Matrix Analysis (XCALABER & SPSS)

INFORMATION MANAGEMENT

- Data Base Management (IPL)
- Custom Applications
- Chemical Substance Management (Chem-Com)
- Graphics

PROJECT MANAGEMENT

- ADP's Project Evaluation and Control System (APECS)

DATA BASES

- Economics—Citibase
- Currency Exchange—ContiCurrency
- Demographics
- Marketing Research
- Corporate Financial Reports—Compustat
- Stock Prices—Fastock
- Banking reports—BANCALL
- Industry Specific
- Energy/Utility
- Raw Materials, Natural Resources
- Transportation

- Also please send information on the new ADP/Onsite Service

Name _____ Title _____ Phone _____ Ext. _____
Company _____
Street _____
City _____ State _____ Zip _____



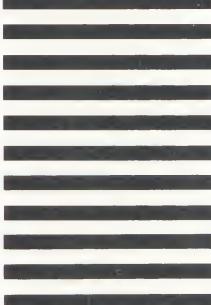
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1652 ANN ARBOR, MI

POSTAGE WILL BE PAID BY ADDRESSEE

ADP Network Services
Attn: Marketing Department
175 Jackson Plaza
Ann Arbor, MI 48106



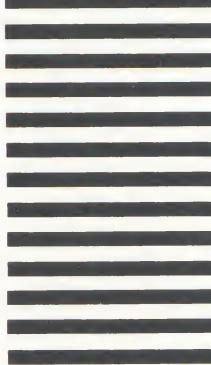
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

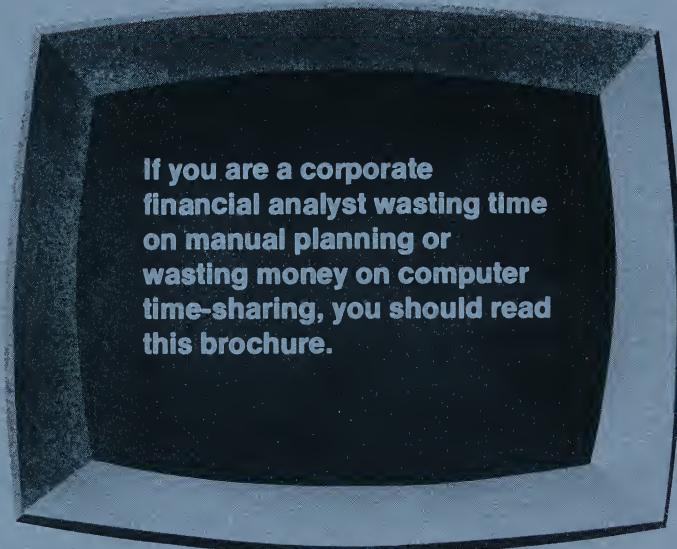
BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1652 ANN ARBOR, MI

POSTAGE WILL BE PAID BY ADDRESSEE

ADP Network Services
Attn: Marketing Department
175 Jackson Plaza
Ann Arbor, MI 48106





If you are a corporate
financial analyst wasting time
on manual planning or
wasting money on computer
time-sharing, you should read
this brochure.

MMI

MINICOMPUTERS
MODELING
INC.

Minicomputer Modeling Inc. introduces . . .

DATA*MODEL . . . a powerful, super-fast turnkey financial planning and risk analysis system designed for today's economical minicomputer hardware.

DATA*MODEL is an incredible new financial reporting system created to provide business analysts with efficient, fixed-cost methods of budgeting, forecasting and financial modeling. It is an excellent tool for simple, in-house minicomputer operations, without the need for specialized data processing personnel.

The ease of operation of **DATA*MODEL** permits minimum personnel training and allows problem-solving professionals fast access to the power and speed of computers when planning, analyzing and projecting business operations. Facts and figures geared to your specific business are gathered

by **DATA*MODEL** just as you instruct it and put into instant tabular reports, with the information you need to make vital decisions.

With the cost of minicomputer hardware going down fast, and the cost of time-sharing going up even faster, **DATA*MODEL** makes sense for you and your company . . . whether you're small and local or big and multi-national.

Here is just a partial list of **DATA*MODEL** uses for the jobs you'd like to get done better, faster and cheaper:

profit and loss forecasts
pro forma statements
budget planning and consolidation
cash flow management
cash requirements forecasting
source and use of funds
capital investment analysis
new business ventures
marketing plans and performance
acquisition or merger analysis
commercial loan analysis
product line planning
product mix evaluation
real estate analysis

land development analysis
maintenance scheduling
depreciation schedules
material/labor requirements
. . . and many, many others

DATA*MODEL major features . . .

AMORTIZATION:	monthly-yearly, multiple loans, consolidated/detail
AUDIT TRAIL:	complete audit trail with documentation maintained
BUDGET/ACTUAL/VARIANCE:	produces Budget vs. Actual with Variance
CONSOLIDATION:	allows unlimited number of consolidations
DEPRECIATION:	straight-line, declining balance, sum of years digits
DOCUMENTATION:	comprehensive User's Guide with samples of each feature
EASE OF USE:	easy-to-follow CRT prompts guide operator
EFFICIENCY:	replaces programming with financial modeling
GOAL SEEKING:	not limited to top-down modeling approaches
INTEGRATED DATA BASE:	all modeling data maintained on-line
INTELLIGENT DATA ENTRY:	source verification during model creation
INTERNAL RATE OF RETURN:	calculates effective interest rate
INQUIRY:	on-line inquiry
MENU CONTROL:	English language prompts guide model building
MODELING LANGUAGE:	high level, user-oriented modeling language
PRESENT VALUE:	discounts stream at user-supplied rate
REPETITIVE USE:	duplicate entries virtually eliminated
REPORT WRITER:	custom reports created and maintained with ease
RISK ANALYSIS:	reruns changing sensitive risk criteria
ROW/COL. MANIPULATION:	complete row/column control
TURNAROUND:	updated forecasts produced in minutes
TURNKEY:	custom programming eliminated
WHAT-IF:	examines numerous planning alternatives

CART/BEFORE/HORSE
Alternate 13 of 80
6/27/78

Zero-Based Democracy
"Peanut Power"
Source and Application of Campaign Funds

Guaranteed Sources:

Peanuts-Salted and Unsalted	16000	3.4	17234	3.5	18468	3.7	19702	3.4
Commissions of Bank Sales	10000	2.1	12000	2.5	14400	2.9	17280	3.0
Religious and Sexual Education	30000	6.3	40000	8.2	50000	10.0	60000	10.4
Commissions on Computer Sales	18435	3.9	18435	3.8	18435	3.7	18435	3.2
Rights to Memoirs							60000	10.4
Salary	400000	84.3	400000	82.0	400000	79.8	400000	69.5
Total Source	474435	%	487669	%	501303	%	575417	%

Expected Applications:

Tooth Paste	500	.1	500	.1	500	.1	500	.1
Air Force One	300	.1	300	.1	300	.1	300	.1
Air Force Two	200	.0	200	.0	200	.0	200	.0
Security	50	.0	50	.0	50	.0	50	.0
Life Insurance	2000	.4	2000	.4	2000	.4	2000	.3
Paper and Paper Clips	3000	.6	3000	.6	3000	.6	3000	.5
Business Lunches	15697	3.3	17581	3.6	19690	3.9	22053	3.8
Guilt Tax Payments	6000	1.3	5000	1.0	4000	.8	3000	.5
Total Application	27747	5.8	28631	5.9	29740	5.9	31103	5.4

Slush Flow

446688 94.2 459038 94.1 471563 94.1 544314 94.6

===== ===== ===== ===== ===== ===== =====

Prepared by the Trusty Division of S.L.Y.B.M.



**For more information,
call (206) 323-4201**

Minicomputer Modeling Inc.

1222 Lakeview Blvd. East
Suite One, Seattle, WA 98102



Product Brief

FIRST DATA 40 SECOND AVENUE/WALTHAM, MASSACHUSETTS 02154/617-890-6701

FASTOCK

FASTOCK is First Data Corporation's computerized stock market data base containing current and historical trading information for over 12,000 stocks, bonds, mutual funds, government issues and market indices. Daily trading statistics for NYSE and AMEX are available from January, 1968 and for OTC issues from January, 1972. Data can be accessed via FASTOCK stand-alone programs or FORTRAN subroutines.

PRIMARY TRADING LOCATIONS

- NYSE
- AMEX
- OTC
- PBW
- NATIONAL
- MIDWEST
- PACIFIC
- TORONTO
- MONTREAL

ISSUES COVERED

- COMMON STOCKS
- PREFERRED STOCKS
- WARRANTS
- RIGHTS
- WHEN ISSUEDS
- MUTUAL FUNDS
- CORPORATE BONDS
- GOVERNMENT & AGENCY BONDS
- FOREIGN ISSUES
- CERTIFICATES
- OPTIONS

Data available includes:

Security Descriptive Items

- CUSIP Numbers And Ticker Symbols
- Exchange Code
- Issuer & Issue Titles
- Issue Type Code
- Trading-Status Code
- SIC Industry Code
- Maturity Or Expiration Date
- Financial Quality Rating (Bonds)

Price/Volume Items

- Closing Price Or Bid/Ask Average
- High Price Or Asking Price
- Low Price Or Bid Price
- Trading Volume

Dividend Items

- Distribution Type Code
- Dividend Amount Or Rate
- Ex-distribution Date
- Record Date
- Payment Date
- Payment Method Code
- Tax Base Code

Fundamental Items

- Shares/Amount Outstanding
- Earnings Per Share (12 mo.)
- 12-Month Ending Date
- Indicated Annual Dividend
- Bond Rate
- Yield To Maturity

FEATURES

•EXTENSIVE HISTORICAL INFORMATION

- DAILY NYSE & AMEX DATA FROM 1-68
- DAILY OTC DATA FROM 1-72
- DAILY AND WEEKLY MARKET INDICES FROM 1-47

•DATA EXTRACTION OPTIONS

- RAW DATA
- ADJUSTED FOR STOCK SPLITS AND DIVIDENDS
- FULLY ADJUSTED FOR ALL DISTRIBUTIONS

•HOLIDAY PRICING

- ZERO
- PRICE OF PREVIOUS TRADING DAY

•CHOICE OF OUTPUT FORMATS

- DECIMAL
- NEAREST 1/8
- NEAREST 1/16
- NEAREST 1/32
- NEAREST 1/64

•SIGNIFICANT COST SAVINGS OVER COMPETITIVE SYSTEMS

•EXTENSIVE ERROR CHECKING OF DATA

•12,000 ISSUES COVERED



"Composition Number II", Serge Poliakoff. Courtesy of Museum of Art, Carnegie Institute, Pittsburgh

OSCAR **Computerized Project Management**

 On-Line Systems Inc.

Tabular Report: shows the impact of schedule changes and actual performance on the future of the project.

OSCAR — For Ease in Producing Accurate, Timely Project Reports for Planning and Control.

OSCAR, On-Line's system for controlling activities and resources, is designed to assist management in effective planning and controlling of a project or group of projects. It offers resource-constrained (RC) scheduling in addition to conventional critical path method (CPM) scheduling. The system is modularly structured allowing users to choose any level of sophistication ... from simple, conventional, critical path method scheduling to complex resource scheduling which might include date constraints, holidays, overtime, project priorities, etc.

OSCAR allows you to identify resources (people, machines, etc.) by category or by their individual names. Resources in a common resource pool may be allocated to one or more projects.

No programming skills are required to input project information into OSCAR or to generate project reports. Project scheduling reports can be printed immediately at the user's terminal; but for extensive output, use of a line printer might be desirable.

A partial list of OSCAR reports includes:

- Network Logic Diagrams and Reports*
- Tabular Reports*
- Bar Graph Reports*
- Distribution of Resources Reports*
- Cost Analysis Reports*
- Utilization of Resources Reports*

In addition to these standard, easy to produce reports, a user can create customized reports by transferring OSCAR data to On-Line Systems' data base management system. The project information can thereby be merged with other data to create virtually any type of report.

OSCAR Minimizes a Project's Duration by Effectively Allocating Resources.

Individual resources can be identified by name and are permitted to work in several capacities. Management can rate individuals in each category in which they are permitted to work. Within any category, this feature enables selection based on management preferences.

HOME - IMPACT REPORT							PROJECT START 1APR77 AT 800 COMPLETION DATE 12AUG77 AT 1300		
STATUS REPORT DATE 20MAY77 AT 800 WORK DAY NO. (36)		REPORT TAB . SORT ES . PRINT # .		1APR77 TO 12AUG77		PAGE 1			
ACTIVITY CODE DESCRIPTION		REPORTED/PROJECTED BASELINE		FLOAT DUR(D)		EARLY DAY TIME	LATE DAY TIME	START & FINISH DAY TIME	
RESOURCE CATEGORY & QUANTITY		BASELINE		FLOAT DUR(D)		EARLY DAY TIME	LATE DAY TIME	START & FINISH DAY TIME	
C A010 EXCAVATE & PLACE FOOTINGS CONTR 4 100%		O 0	1APR77	21APR77				<FINISHED>	
		15 0	1 800	15 1700					
		O 0	1APR77	21APR77	1APR77	21APR77			
		15 0	1 800	15 1700	1 800	15 1700	E/S ON SCHEDULE		
C A020 CONSTRUCT BASEMENT WALLS MASON 2 100% CONTR 2 100%		O 0	22APR77	4MAY77				<FINISHED>	
		8 0	16 1500	24 1500					
		O 0	22APR77	3MAY77	22APR77	3MAY77	E/S 0 DAYS		
		8 0	16 800	23 1700	16 800	23 1700	BEHIND SCHEDULE		
C A030 FRAME FLOOR CARP 3 100% CONTR 2 100%		O 0	4MAY77	9MAY77				<FINISHED>	
		3 0	24 1600	27 1600					
		O 0	4MAY77	6MAY77	4MAY77	6MAY77	E/S 0 DAYS		
		3 0	24 800	26 1700	24 800	26 1700	BEHIND SCHEDULE		
C A050 INTERIOR STUDS & DUCTWORK CARP 4 100%		O 0	5MAY77	6JUN77	5MAY77	6JUN77	<IN PROGRESS>		
		19 5	27 800	46 1300	27 800	46 1300	46% COMPLETE		
		O 0	5MAY77	27MAY77	5MAY77	27MAY77			
		15 0	27 800	41 1700	27 800	41 1700	E/S ON SCHEDULE		
C A110 FRAME ROOF & EXTERIOR ROUGHING CARP 2 100% CONTR 2 100%		O 0	9MAY77	11MAY77				<FINISHED>	
		3 0	27 800	29 1700					
		O 0	9MAY77	11MAY77	9MAY77	11MAY77			
		3 0	27 800	29 1700	27 800	29 1700	E/S ON SCHEDULE		
C A040 FRAME WALL & EXTERIOR ROUGHING CARP 2 100% CONTR 2 100%		O 0	11MAY77	17MAY77				<FINISHED>	
		5 0	29 800	33 1700					
		O 0	9MAY77	13MAY77	9MAY77	13MAY77	E/S 2 DAYS		
		5 0	27 800	31 1700	27 800	31 1700	BEHIND SCHEDULE		
A120 INSTALL WINDOWS CARP 2 100%		O 0	13MAY77	17MAY77					
		2 0	36 800	37 1700	49 1300	51 1300	<DUE TO START>		
		16 0	11MAY77	12MAY77	3JUN77	5JUN77			
		2 0	29 800	30 1700	45 800	46 1700			

With OSCAR You Can...

Depict your project accurately and reduce processing cost with the precedence technique of input.

Analyze capacity of staff and machines, then see the future effect of adding or removing these resources.

Choose time units (hours, days, weeks) most appropriate to your particular needs.

Base your schedule on company time by using a work week based on any length of day.

Dynamically balance your resources and work load. Assign your people and machines for maximum effectiveness.

Update, add, correct your network configuration and schedules.

Identify potential bottlenecks, see where a lack of resources may delay project completion, and take timely corrective action. Monitor project progress and costs by producing impact reports to compare revised schedules with planned baseline schedules.

Run multiproject scheduling which permits you to see the effects that several unrelated projects have on your resource pool.

Rated #1 In "Ease of Use" and "Reliability"

In a May 1976 Datapro "Computer Service Company Survey" a sample of time-sharing users rated various categories of services provided by 25 computer service type companies. As part of that survey On-Line Systems was rated #1 in "Reliability" and "Ease of Use." OSCAR is part of that standard as it allows the user to make scheduling changes fast, easy and inexpensively.

On-Line Systems, Inc. is headquartered in Pittsburgh with 17 branch offices in the United States, Canada and the United Kingdom. We provide continuous processing and personal service to industry, financial organizations, government, institutions, and businesses of all types and sizes.

On-Line Systems, Inc.
115 Evergreen Heights Dr.
Pittsburgh, PA 15229
(412) 931-7600

On-Line Systems Inc.

ORBIS

On-Line's
Resource Budgeting
Information System

General:

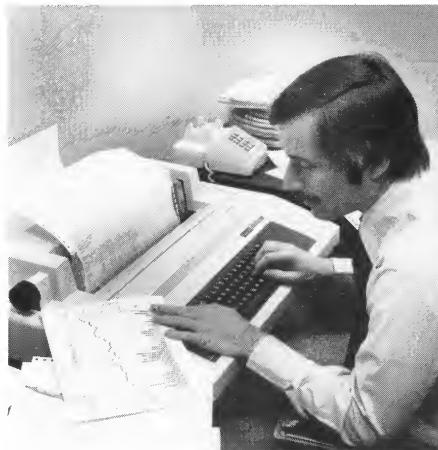
ORBIS, On-Line's Resource Budgeting Information System is a computerized financial planning—budgeting—monitoring system. The system provides interactive or remote batch computing services and is accessed from on-location computer terminals. ORBIS employs On-Line's data-base management system OLIVER, to provide ease of use, unprecedented flexibility, and cost effectiveness. ORBIS is especially suited to the zero-base budgeting technique.

The system improves the planning process by giving managers control of information at all levels . . . from the smallest decision unit to the chief executive. ORBIS utilizes an English command language and format prompting to simplify input, editing, and report generation. It provides immediate turnaround for numerous users which may be working simultaneously. The application is open-ended to accommodate virtually any number of decision packages with any level of descriptive detail.

As the iterative process of ranking, review, consolidation, and reranking is taking place, the system automatically recomputes resource costs and provides either standard or customized reports for all decision levels. Window reports for any line item, account code area, decision unit, or organizational level can be continuously accessed on demand.

ORBIS reduces the need for costly forms processing as screen formats can be used to input data. In addition, numerous easy to read graphic and screen reports have been programmed into the system.

ORBIS represents one of the first zero-base automated systems that provides both conventional and zero-base budgeting. It can be totally integrated into an organization's accounting control system. At such a level the system will accurately retrieve actual costs from the general ledger and thereafter provide variance reports.



Accessing ORBIS "On-Location"

ORBIS Capabilities/Benefits:

- Produces standard and customized reports on command.
- Permits you to move to and from programs, decision packages, and conventional budgeting analysis.
- Decision packages can be listed at any organizational level.
- Identifies decision packages for any specified function so that common work measures can be analyzed.
- Enables you to identify the required head count for each decision unit or organizational level.
- Allows you to add, delete or revise decision packages at any time and at any level.
- After cutoffs are established ORBIS recomputes resource allocations and costs based on redefined priorities.
- Allows you to move decision packages into other budgeting periods to analyze resource costs and decision packages.
- Permits ranking, consolidation, and reranking of programs and at various organizational levels.
- Permits managers to define account coding systems and expand them as needed.
- A modular design for fast and easy implementation, modification and expansion.
- A system design that permits easy interface to existing information systems.
- Provides immediate turnaround for numerous users who may be working simultaneously.

Planning/Budgeting

- Allows you to reforecast at any time during the month or year, and thereafter produce revised budgets at all organizational levels.
- Produces historical cost comparison reports for any budget period.
- Provides 'what if' inquiry at any management level.
- The system retains initial decision package priority rankings and the baseline budget so that decision unit managers can continuously monitor performance.
- A fully prompted system requiring no special computer skills to operate.
- Ensures integrity of data and multilevel security.
- State-of-the-art data base management system that readily handles large volumes of data.

Access to ORBIS:

A wide range of terminals can be used to access ORBIS, 24 hours a day, 7 days a week. Interaction with the system is made possible through an international network of telephone lines and a satellite transmission system. On-Line Systems provides "Local Call" service in major market areas within the United States, Canada, and Europe.

On-Line Systems— An International Computer Services Company

On-Line Systems provides three basic methods of processing client information, namely: on-line or interactive, remote batch, and batch.

The main computer complex headquartered in Pittsburgh consists of numerous large scale computer systems. Mini computers provide local communications and peripheral support in major market areas throughout the United States, Canada and Europe.

ORBIS

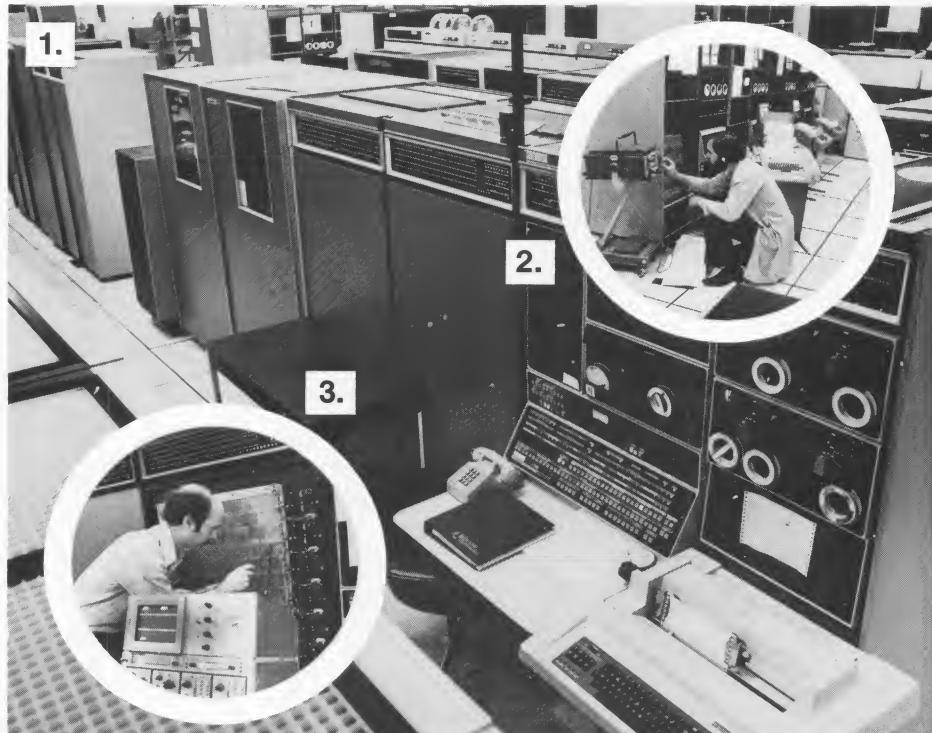
On-Line's
Resource Budgeting
Information System

Planning/Budgeting

Overview of Services:

- Client-shared use of highly reliable computer systems, and communications networks.
- On-Line's around-the-clock support and commitment to the application.

- A number of fully developed specialty software packages for use in areas such as: correspondence management, financial modeling, inventory control, personnel development, project management, graphics design, materials processing and statistical analysis.



1. The east wing of On-Line's Operations Room.

2. PDP-11, communications network, the vital link between branch offices and headquarters.

3. For greater reliability On-Line's equipment is maintained, in-house.

■ Complete hardware and software back-up of the system.

■ Systems analysis, programming, technical and computer operations support on a contract basis.

■ A well-maintained library of nearly 1000 software programs.

■ Complete documentation and training (per contract terms).

■ Comprehensive graphics services.

■ Distributed processing applications.

Implementation of ORBIS:

Orientation to ORBIS and its various components can be accomplished within hours. On-Line's simplified approach toward documentation and training helps make this possible.

ORBIS is offered on a short or long term basis, depending on your needs.

We welcome the opportunity to review your planning and budgeting needs, no matter where you are in this process. Our branch office technical and marketing support staff would be happy to demonstrate ORBIS showing you how it can be quickly implemented within your organization.

We can support you **now** by helping to set the ground work and pave the way for a fully implemented automatic system. Or, if you are using another approach for planning and budgeting we would be glad to compare its cost and benefits to ORBIS. Call or write today for a no obligation demonstration.



On-Line Systems, International Headquarters; Pittsburgh, Pennsylvania.

ON-LINE SYSTEMS, INC. Offering Personal, Professional Service From:

CORPORATE OFFICE
115 Evergreen Heights Drive
Pittsburgh, PA 15229
(412) 931-7600

BRANCH OFFICES

Atlanta, GA	Detroit, MI
Baltimore, MD	Los Angeles, CA
Boston, MA	New York, NY
Buffalo, NY	Philadelphia, PA
Chicago, IL	Pittsburgh, PA
Cleveland, OH	Rochester, NY
Clifton, NJ	Silver Spring, MD
Dallas, TX	Washington, D.C.

SUBSIDIARIES
OLS Computer
Services Canada Ltd.
Atkins—On-Line
(U.K.) Ltd.

with local dial-up service in:

Arlington, VA	Long Island, NY
Atlanta, GA	Los Angeles, CA
Baltimore, MD	Milwaukee, WI
Boston, MA	Montreal, Quebec
Buffalo, NY	New York, NY
Calgary, Alberta	Philadelphia, PA
Chicago, IL	Pittsburgh, PA
Cleveland, OH	Rochester, NY
Clifton, NJ	San Antonio, TX
Dallas, TX	San Francisco, CA
Detroit, MI	Seattle, WA
Elmira, NY	Toronto, Ontario
Fort Worth, TX	Vancouver, B.C.
Halifax, Nova Scotia	Washington, D.C.
London, England	Winnipeg, Manitoba

Are You Locking Up Your Resources by Ineffectively Linking Your Plan to Your Budget?



You've worked hard to set your organization's goals for the coming years. You've established the projects and activities that will achieve those goals.

Now You Need to . . .

- Plan and allocate resources to those projects and activities.
- Quickly make changes through the planning cycle.
- Measure the results.

ORBIS, On-Line's Computerized Resource Budgeting Information System systematically links your goals to your programs, cost centers, account codes, and decision packages. Now you can have immediate feedback on your planning, budgeting and resource allocation performance when using either **Conventional Project, Zero-Base** or a combination of these budgeting techniques.

Regardless of technique you're sure to realize the even greater benefits of a better plan and improved communications throughout your organization when using this unique management tool.

We assure you that after seeing an interactive demonstration of ORBIS, using your data, you will be positively impressed with the capabilities, benefits, and flexibility that this new system offers. We can have it working for you in days, not months, in a language you will understand—English.

Call Brian Wiltshire, Vice President, Marketing Div. at (412) 931-7600. Call today or write for **free** ORBIS brochure.



On-Line Systems Inc.
115 Evergreen Heights Road Pittsburgh, Pennsylvania 15229



Your Department's Information Processing Gets First Priority When Using the OUTLINE/1 Service...



...On-Line Systems intelligent data entry capability. This new delivery system utilizes the OLS-1500, a low cost, high performance intelligent terminal and diskette storage unit.

The OLS-1500 performs intelligent off-line data entry, verification, and reporting at your remote locations.

**It Makes Good Sense to Buy
Distributed Processing
Hardware From the People Who
Specialize in Combining All the
Elements of Computer
Technology.**

The OUTLINE/1 Service harnesses state-of-the-art technology to On-Line's host computers, network, and application software for even greater cost effectiveness. You can also take advantage of On-Line's already developed, field proven applications such as:

- OLIVER—a data base management system for implementing a wide variety of applications.
- OSCAR—a project management system.
- ORBIS—a planning, budgeting, and monitoring system for conventional, program, and zero-base approaches.
- FMS—a financial modeling system for simulating business operations.
- OMAR—a marketing management information system.

Implementing OUTLINE/1 in your organization can result in increased productivity and reduced data entry costs.

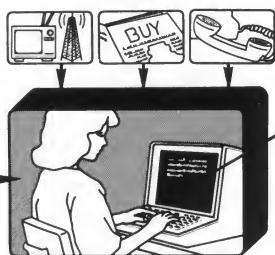
Write today for our **free** OUTLINE/1 Brochure which explains how you can quickly implement OUTLINE/1 within your organization, or call William Nemanick, Manager of Product Marketing at (412) 931-7600.

On-Line Systems Inc.
115 Evergreen Heights Road Pittsburgh, Pennsylvania 15229



Improve Your Advertising and Sales Performance With OMAR

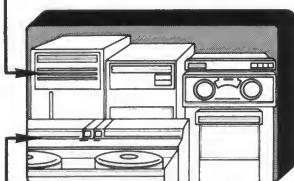
OMAR Sales Lead Processing System



your headquarters or field office clerical personnel record sales lead information into a computer terminal.

Lead number [1263]
Name (F.M.I.) [Robert] [N] [Stemline] Title [Mr]
Position [President] Company [Chicago Conveyor Co. Inc.]
Street [1300 Helen Ave.]
City [Chicago] State [IL] Zip [60606]
Phone [3123656660] Branch [CHI] Region [CEN]
Source Category Description Date Product advertised
[2] [22] [30-AUG-78] [C]
Any more data? []
Status [BREN] Status date [08-SEP-78]
Remarks []
Date signed [] Probable delivery date []
Reason why []
SIC [3535] Revenue(\$000) [10000] Sales rep [Laura Murdoch]
Lead quality [C] Potential revenue/month []
Close probability [] Probable close date []
Customer interest [] [] []

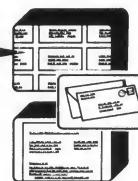
OMAR computer terminal screen mask is used to speed and simplify the task of entering lead information. As sales activity progresses, the lead information can be recalled and the status section (center) used to update the lead.



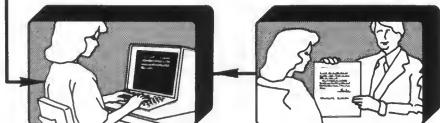
computers at On-Line's headquarters receive this information and simultaneously make it available to your sales offices, via our extensive telephone network.



Your sales office manager then follows up the lead.



This follow-up could include printing a personalized letter and envelope (or label). The letters can be processed just as soon as the prospect information has been typed into the terminal.



As often as desired, reports can be generated at your sales offices. These reports identify prospects and indicate the follow-ups that have been made by your headquarters or branch offices.

PROSPECT	EXPECTED REVENUE AND STATUS REPORT As of 15-DEC-78 Probability of Close of At Least 60 percent				
	BRANCH	DALLAS	STATUS	DATE	REMARKS
SALESMAN Joan Parks Rowe Machinery & Mfg. Co., Inc.	GOOD	HQEN	PRODUCT INTEREST	PROJECTED REVENUE (\$)	PROBABILITY OF CLOSE (%)
	LEAD QUALITY				
Metro Ford Truck Sales Inc.	GOOD	HQEN	A	30,000	75 %
	LEAD QUALITY				
	GOOD	B		6,000	90 %

OMAR can become the vital communications link between your advertising and sales departments. This new marketing intelligence system offered by On-Line Systems, Inc. utilizes computer technology to record, track, analyze and report advertising and sales performance.

Detailed sales lead information can be immediately formatted and sent, via telephone communications lines, to your local sales offices. OMAR uses typewriter-like terminals for entering and updating your sales lead information. By updating your prospect records you can virtually eliminate time consuming sales call reporting.

With OMAR you can accurately evaluate your headquarters and local promotions by reviewing specific promotional response and sales progress reports.

OMAR also allows you to automatically produce personalized response letters from the sales lead information recorded in OMAR.

Write today for our **free** OMAR brochure which explains how you can quickly implement OMAR within your organization, or call Brian Wiltshire, Vice President, Marketing Division at (412) 931-7600.

On-Line Systems Inc.
115 Evergreen Heights Road Pittsburgh, Pennsylvania 15229





153 East 53rd Street
Box 1127
New York, N.Y. 10043
(212)559-3636

DECsystem-20® Remote Computing Services

Fundamental Facts

CONFIGURATION

DECsystem-20s with 512K words available to users, on-line disk storage, 800/1600 BPI tape drives, high speed line printer and card reader.

PROGRAMMING LANGUAGES

FORTRAN IV	BASIC	APL	IQL
ANSI COBOL	EXTENDED BASIC	MACRO	DBMS-20

PRIME TIME VS. NON-PRIME TIME—DEFINITION

Monday through Friday
Saturday and Sunday

PRIME
8:00 a.m.—6:00 p.m.

NON-PRIME
All other times
All times

When an operator is not scheduled to be in attendance during a holiday period, prime time usage will be billed at non-prime time rates.

In order to be eligible for non-prime rates for connect time and CRU usage, the entire logged-on session must occur within non-prime time. All resources used for jobs initiated during non-prime but running into prime time, or initiated during prime time but running into non-prime time, are charged at prime rates.

SYSTEM OPERATION¹

The DECsystem-20 is scheduled to be operational during the following hours:

Monday 8:00 a.m.—Midnight
Tuesday-Sunday 24 hours

SYSTEM MAINTENANCE¹

Monday 12:01 a.m.—8:00 a.m.

All times quoted are local time, New York, N.Y.

¹"Citishare" is a Service Mark of Citibank, N.A.

®"DECsystem-20" is a registered trademark of Digital Equipment Corporation.



Created and Managed
by a Subsidiary
of Citicorp.

OPERATOR COVERAGE¹

Monday 8:00 a.m.—Midnight
Tuesday-Friday 24 hours
Saturday 12:01 a.m.—8:00 p.m.
Sunday and Holidays Coverage will be announced via system message.

Persons using the computer during periods of no operator coverage should be aware that tapes cannot be mounted, the printer cannot be serviced, and no corrective actions can be taken in the event of system failure.

SERVICE DESK¹

The Service Desk is a telephone inquiry service made available by Citishare to answer technical and administrative inquiries. Users faced with any problem which is not answered in the available literature should call the Service Desk.

Monday through Friday 8:00 a.m.—5:30 p.m.
Saturday, Sunday and Holidays Coverage will be announced via system message.

Whenever the Service Desk is not covered, the operations staff will attempt to respond to critical Service Desk calls. It is recommended that programming and technical inquiries be deferred until normal coverage of the Service Desk.

I/O CONTROL DESK¹

Monday through Friday 8:00 a.m.—5:30 p.m.
Saturday, Sunday and Holidays No coverage

When the I/O Control Desk is not covered, users are requested to make special arrangements with the operators (559-4357) before picking up their output. The Citishare I/O Control Desk is located at 399 Park Avenue (53rd Street), Level B.

BACKUP OF ON-LINE STORAGE

<u>TYPE</u>	<u>DAY AND APPROXIMATE TIME</u>		<u>RETENTION</u>
Incremental (daily)	Monday through Friday	8:00 p.m.	1 week
Complete (weekly)	Saturday	1:00 p.m.	4 weeks
Complete (monthly)	Last Saturday of month	1:00 p.m.	2 years
Complete (yearly)	Last Saturday of year	1:00 p.m.	Indefinitely

TELEPHONE NUMBERS

559-0049 I/O Control
559-4357 Service Desk
559-3636 Marketing & Administration

758-3100 Citishare III Computer—30 characters per second
935-5985 Citishare III Computer—120 characters per second (Prentice 1200 Plus modem)
751-1581 Citishare III Computer—120 characters per second (Bell 212A modem)

355-1220 Citishare IV Computer—30 characters per second
755-2820 Citishare IV Computer—120 characters per second (Bell 212A modem)

¹Any change to the posted schedules will be announced via the MAIL facility of the DECsystem-20.



153 East 53rd Street
Box 1127
New York, N.Y. 10043
(212)559-3636

DECsystem-20® Remote Computing Services

Price Schedule

INTERACTIVE ON-LINE CONNECT TIME

For line speeds up to and including 300 baud—
Prime time: \$6.50 per hour; Non-prime time: \$2.50
per hour.

For line speeds of 1200 baud—
Prime time: \$9.50 per hour; Non-prime time: \$4.00
per hour.

*Prime time (8:00 A.M.—6:00 P.M. local time, New
York, N.Y., Monday through Friday).*

Non-prime time (all time other than prime time).

When an operator is not scheduled to be in attendance during a holiday period, prime time usage will be billed at non-prime time rates.

In order to be eligible for non-prime rates for connect time and CRU usage, the entire logged-on session must occur within non-prime time. All resources used for jobs initiated during non-prime but running into prime time, or initiated during prime time but running into non-prime time, are charged at prime rates.

CITISHARE RESOURCE UNIT (CRU)

Prime time: \$.01 per CRU; Non-prime time: \$.003 per CRU.

A CRU is a measure of usage of various system resources including, but not limited to, CPU, paging, I/O, network communications and/or software.

DEFERRED PROCESSING CONNECT TIME (Batch Via A Pseudo Terminal)

Prime time: \$2.50 per hour; Non-prime time: no charge.

A pseudo terminal is automatically logged in during batch runs.

DISK STORAGE

\$.02 per day per disk page.

A disk page is equal to an allocation of 2560 characters or any part thereof, measured on a per file basis.

PERIPHERAL USAGE

Magnetic Tape

\$9.00 per hour, with time rounded upward to next 1/2 hour increment; plus \$5.00 per mount.

Magnetic tape reel rental and/or vault storage: \$5.00 per month per reel.

Tape sales: \$15.00 per reel.

Line Printer

1-Ply: \$.015 per page; minimum \$1.50 per run.

2-Ply: \$.03 per page; minimum \$3.00 per run.

3-Ply: \$.045 per page; minimum \$4.50 per run.

4-Ply: \$.06 per page; minimum \$6.00 per run.

Non-standard forms: \$.015 per page plus \$5.00 set-up charge; \$5.00 minimum per run excluding set-up charge.

Non-standard forms available only during non-prime time. Users must supply forms, control tape and forms.

Card Reader

\$6.00 per hour, with time rounded upward to next 1/2 hour increment; \$3.00 minimum.

MISCELLANEOUS

Monthly minimum: \$250 per month.

Citishare, at its sole discretion, may apply a late charge not to exceed 1 1/2% per month on any past due account.

Prices quoted do not include Federal, state or local taxes imposed upon the use of the services.

Other services including dedicated ports, bulk storage, special software packages, manuals, consulting, DECsystem-10 usage, network, etc. are available. Details and pricing will be quoted upon request.



Created and Managed
by a Subsidiary
of Citicorp.

Because of capacity limitations, the services are subject to prior sale.
Prices are subject to change upon 60 days' prior written notice. The method of measuring the CRU may be modified or changed from time to time without notice.

REV. 1 9/1/77

© "Citishare" is a Service Mark of Citibank, N.A.

© "DECsystem-20" is a registered trademark of Digital Equipment Corporation.





153 East 53rd Street
Box 1127
New York, N.Y. 10043
(212)559-3636

NETWORK ACCESS LOCATIONS

Alabama
Birmingham
Alaska
Anchorage
Juneau
Arizona
Phoenix
Tucson
Arkansas
Little Rock
California
Alhambra
Burlingame
El Segundo
Fresno
Hayward
Los Angeles
Marina Del Rey
Mountain View
Newport Beach
Oakland
Palo Alto
Riverside/Colton
Sacramento
San Clemente
San Diego
San Francisco
San Jose/Cupertino
San Pedro
Santa Barbara
Santa Rosa
Van Nuys
Ventura/Oxnard
Colorado
Colorado Springs
Denver
Connecticut
Bridgeport
Danbury
Darien
Hartford
New Haven
Waterbury
District of Columbia
Washington
Delaware
Wilmington

Florida
Ft. Lauderdale
Jacksonville
Miami
Orlando
Pensacola
St. Petersburg
Tampa
W. Palm Beach
Georgia
Atlanta
Savannah
Hawaii
Honolulu
Idaho
Boise
Illinois
Chicago
Freeport
Rockford
Indiana
Evansville
Ft. Wayne
Indianapolis
Marion
South Bend
Iowa
Cedar Rapids
Des Moines
Iowa City
Kansas
Topeka
Wichita
Kentucky
Lexington
Louisville
Louisiana
Baton Rouge
Lafayette
New Orleans
Maryland
Baltimore
Massachusetts
Boston
Springfield
Michigan
Ann Arbor
Detroit
Grand Rapids
Jackson
Kalamazoo
Plymouth
Southfield
St. Joseph

Minnesota
Minneapolis
Mississippi
Jackson
Missouri
Kansas City
St. Louis
Nebraska
Omaha
Nevada
Carson City/Reno
Las Vegas
New Hampshire
Manchester
Nashua
New Jersey
Lyndhurst
Englewood Cliffs
Moorestown
Newark
Piscataway
Princeton
Wayne
New Mexico
Albuquerque
New York
Albany
Buffalo
Corning
Hempstead
Huntington
New York
Niagara Falls
Rochester
Syracuse
White Plains
North Carolina
Charlotte
Durham
Greensboro
Winston-Salem
Ohio
Akron
Cincinnati
Cleveland
Columbus
Dayton
Toledo
Oklahoma
Oklahoma City
Tulsa

Oregon
Portland
Pennsylvania
Allentown
Erie
Harrisburg
Philadelphia
Pittsburgh
Valley Forge
York
Rhode Island
Providence
South Carolina
Columbia
Greenville
Tennessee
Chattanooga
Knoxville
Memphis
Nashville
Texas
Austin
Baytown
Beaumont
Dallas
El Paso
Ft. Worth
Houston
Longview
Lubbock
Midland
Odessa
San Antonio
Utah
Salt Lake City
Virginia
Norfolk
Richmond
Washington
Seattle
Spokane
West Virginia
Charleston
Wisconsin
Madison
Milwaukee
Oshkosh
Argentina
Buenos Aires

Australia
Sydney
Austria
Vienna
Bahrain
Belgium
Brussels
Canada
Calgary
Edmonton
Montreal
Ottawa
Toronto
Vancouver
Denmark
Copenhagen
Finland
Helsinki
France
Paris
Germany
Frankfurt
Hong Kong
Israel
Tel Aviv
Italy
Milan
Rome
Mexico
Mexico City
Monterrey
Netherlands
Amsterdam
Norway
Oslo
Philippines
Manila
Portugal
Lisbon
Puerto Rico
San Juan
Singapore
Spain
Madrid
Sweden
Farsta
Switzerland
Berne
United Kingdom
London

- Specific telephone numbers can be obtained from the Service Desk, (212) 559-4357, or by typing: **HELP NETWORK <CR>** on the DECsystem-20.
- For information on network usage charges, please call your account representative.

How To Log-In

1. Turn the terminal on and set switches for remote session.
2. Dial the nearest network access number and wait for the high-pitched tone.
3. Couple the terminal to the telephone line:
 - For acoustic couplers, place the handset firmly in the coupler.
 - For datasets (Bell 103 or 113 type), depress the DATA button.
4. The following message will be sent to your terminal at 30 cps or 120 cps (this will appear garbled at other speeds):

PLEASE TYPE YOUR TERMINAL IDENTIFIER

5. Type your terminal identifying character.¹
6. The network will then send:

—XXXX—YY--
please log in:

(XXXX is the remote access node number and YY is the port number on that node to which your terminal is connected.)

Respond by typing your network user name¹ (preceded by a control H for half duplex operation in ASCII), followed by a carriage return.

7. The network then prompts for your password.¹

PASSWORD:

Respond by typing the network password, followed by a carriage return. (For security reasons, on full duplex terminals, your password will not print.)

8. Wait until you receive either a semicolon (;) or the "cit (3 or 4) is online" message, both of which indicate a connection to Citishare's computer. You are now ready to log-in to this computer by typing.

LOGIN userid <CR>

After log-out from the Citishare computer, hang up the telephone to terminate billing for the network.

¹Terminal identifier, user name, and password for the network are available from the Service Desk, (212) 559-4357.

Network Messages

ALL PORTS BUSY OR HOST OUT OF PORTS

A connection with the Citishare computer cannot be made at this time because the host ports available to the network are all busy. Try again in a few minutes.

HOST NOT AVAILABLE THROUGH NET

This message can occur if: 1) the network or its neighbor(s) is down, 2) an invalid host has been requested (perhaps mistyped), or 3) a new supervisor is taking over the network and has not yet picked up that host. Try again in a few minutes.

HOST DOWN

The network is fully operational, but the Citishare computer is down.

HOST SHUT

The supervisor has been notified to route no new users to the Citishare computer; current users are not affected.

DROPPED BY HOST SYSTEM

The user has logged out and/or has been disconnected by the Citishare computer. If the session is finished, hang up; if not, try again.

CIRCUITS BUSY

All available paths to the network are busy; try again in a few minutes.

TRY AGAIN IN 5 MINUTES

A new supervisor is taking over the network and a log-in will normally be possible in a few minutes.

PLEASE TRY AGAIN

An attempt has been made to log-in to a multi-host system with an incorrect user code.

REQUESTED SUBPROCESSING IS UNAVAILABLE

The process that you wish to use in the Citishare computer is not available for access at this time.

LAW FIRM FINANCIAL ANALYSIS AND WORK CONTROL SYSTEM (LAWS)

A Computerized Bookkeeping System for Law Firms

LAWS is an on-line computerized service for law firm management operated from the firm's office through a terminal connected to the ACTS Time-sharing Computers via phone lines. The service is an inexpensive, easy-to-use, timesaving answer to simplify client billing and to improve law firm management.

The System Provides the Means to:

- Reduce excessive time spent on billing preparation and record control
- Control outstanding accounts receivables
- Manage and plan cash flow
- Assess profit margins and case volume
- Monitor client case progress and work flow
- Measure and evaluate performance and productivity for both the firm and individual attorneys
- Establish control of the billing cycle

System Highlights Include:

Reports

- Attorney designed
- Contain information vital for objective management decisions and sound financial operation
- Customized report terminology for each firm
- Selection and timing is determined by firm

ACTS Computer

- Does all the tough work of organizing, editing, and producing reports from the firm's simple input
- Full computer power is available when needed
- Firm does not bear burdens of: costly computer equipment, time-consuming hardware analysis and maintenance, discouraging system development cycles

Communicating Terminal

- Low cost
- Direct control provides security over original input.
- Offers immediate and fast response to all operations

How to Use the System

LAWS is easy to operate, and requires no formal training. Your clerk/typist simply codes the time and cost information she wants recorded, and feeds the information into the computer over telephone lines through the communicating terminal located in your office.

The ACTS Computer instantaneously checks the information for accuracy, and integrates it into the Computer's data bank for the firm for later retrieval.

Then, when the stored information is needed for review, the clerk types her request into the terminal. Selected reports can either be instantaneously available through your terminal, or expedited directly to you from ACTS' Computer Center.

Reports Available:

Client Work-in-Process—An up-to-date, detailed accounting of unbilled, case-related time, fees and costs. (On firms terminal, if desired.)

Unbilled Time—A summary of unbilled time and costs for each case, by billing and working attorneys.

Aged Accounts Receivables—A listing of outstanding receivables, with aging to 91+ days, for each client, case and billing attorney.

Monthly Time Log—A detailed time record for each attorney's reported activities during the month.

Attorney Work Performance—An analysis of time spent for each attorney showing the hours distributed to specific law services performed and to the type of law practiced.

Pro Forma Statements—A detailed statement reflecting costs and fees for current client billing including previous balance due. (On firms terminal, if desired.)

Disbursements Journal—A list of disbursements or costs paid by the firm for each client during the month.

Cash Receipts Journal—A list by day of client cash payments received during the month.

Statement Register—A list of Pro Forma Statements sent to clients during the month.

Deleted Matters Register—A list of cases cancelled during the month and the status of each upon cancellation.

Client List—A current cross-referenced list of clients and cases.



LEAR SIEGLER, INC.

ACTS COMPUTING DIVISION

29200 SOUTHFIELD ROAD
SOUTHFIELD, MICHIGAN 48076
(313) 557-6800



Zeta Research

DIVISION OF NICOLET
INSTRUMENT CORPORATION

— Plotting the Future



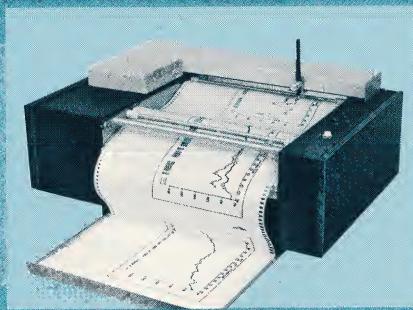
Zeta Plotters

—Speed, Versatility, Exceptional Line Quality and Cost Effective Plotting

Zeta is the industry's most versatile plotter manufacturer—offering a full line of high speed incremental units for on-line, time-sharing or off-line systems. Plotting systems are our only business.

In addition, Zeta makes the most advanced state-of-the-art controllers—key elements that let our plotters mate with a wide variety of computers and terminals. Add to these complete operational software packages, including efficient Graphic Machine Language (GML) software, and you can see why Zeta plotters are the choice of people who want computer data translated into clear, concise cost effective graphics.

All Zeta plotters utilize continuous feed paper (120 to 144 feet long) so that manual paper changing is kept to a minimum.



12 Inch Plotter

Handsomely styled and compact, Zeta desktop models have an 11-inch plotting width. They provide an excellent means of converting computer data into graphic pictorial presentations.



36 Inch Plotter

Faster and more cost effective than competitive units, the 3600 Series Plotters have four pens with a full 34 inches of plotting width for each pen. These plotters are ideal for creating large, graphic displays.

Plotters

Model 130 A 12-inch plotter which plots at the industry standard rate of 300 steps per second. Both 5 and 10 mil increment sizes are available. Speed is 4.2 inches per second (IPS) diagonally, 3 IPS in axes.

Model 150 This 12-inch unit is the result of Zeta's advanced plotter technology. Has a speed of 450 steps per second and 10 mil increment size. Speed is 6.3 inches per second diagonally, 4.5 IPS in axes.

Model 160 A 12-inch plotter for the user requiring both excellent line quality and high speed. Plots at the rate of 600 5 mil increments per second. Speed is 4.2 IPS diagonally, 3 IPS in axes.

Model 170 A 12-inch plotter which provides precise plotting at a rate of 800 2.5 mil increments per second. Speed is 2.8 IPS diagonally, 2 IPS in axes.

Model 1200 A high-speed 12-inch plotter that provides maximum plotting throughput for today's computers. The plotter is controlled by use of a software rate algorithm. Increment size is 0.0025 inches. Maximum speed is 3000 steps per second. Speed is 10.6 IPS diagonally, 7.5 in axes.

Model 1400 A high-speed 12-inch plotter with four programmable pens that provide four color plots quickly and efficiently. This variable speed plotter has an increment size of 0.0025 inches. Maximum speed is 4000 steps per second or 14.14 IPS diagonally, 10 IPS in axes.

Model 3600B A 36-inch plotter that generates plots at speeds up to 3000 steps per second from standard subroutines. Has four pens with a full 34 inches by 120 feet plotting area for each pen. The 3600B is also controlled by use of a software rate algorithm. Increment size is 0.0025 inches. Speed is 10.6 IPS diagonally, 7.5 IPS in axes.

Model 3600S Same as 3600B, but has maximum speed of 4000 steps per second. Speed is 14.14 IPS diagonally, 10 IPS in axes.

Most Zeta plotters have a variety of standard options including alternate English and/or Metric step sizes.

Software

Fundamental Plotting Subroutines

Complete operational software packages are available for every Zeta plotter. These Zeta subroutines include the industry standard calls and are extremely powerful in achieving a maximum of control over the plotter and a minimum of effort for the user. In addition, Zeta offers a number of new subroutines allowing even greater plotter flexibility.

Graphic Machine Language (GML)

GML reduces relative vector commands to a transmission of only significant digits. Up to three GML annotation vectors: Character Vector (CV), Centered Character Vector (CCV) and Numeric Vector (NV) provide 214 different characters which may be plotted at virtually any size and angle. GML features include APL and ASCII fonts, upper/lower case in EBCDIC and ASCII, variable slant and width-to-height aspect for all annotations, circle and arc generators, extensive dashed line capability and scaling. GML software typically enables a high speed Zeta plotter to operate from two to ten times faster than other drum plotting systems. GML is used with 50 Series, MPI and 6000 Controllers.

Look Ahead Variable Acceleration (LAVA)

LAVA delivers high speed on curves by slewing through endpoints. This feature is provided in firmware on 50 Series and MPI Controllers.

Differential Vector Technique

Differential vector software/hardware is a data compression technique which uses a compressed control code to define plotting modes and commands. This technique is used in the Model 40 Controller and the 230 Series Plotters.

Program Application Library Sharing

Zeta PALS is an active program at Zeta promoting the sharing of user programs. Zeta maintains a library of these routines and distributes source copies to any Zeta customer as ordered. There is a nominal handling charge for some packages.

Controllers

Model 53

This microcomputer based controller may be used as a timesharing controller or as an on-line RS-232 controller. When combined with any Zeta plotter, the 53 provides a breakthrough in key advantages to the plotter user. High throughput and reduced operating cost are achieved due to the distributed computing accomplished by the Model 53. Typically, host CPU time (and cost) is reduced by over 2-to-1. Communication line transmission error detection and correction is included. The Model 53 also contains 2048 bytes of Random Access Memory (RAM) dedicated for communication buffering. The RAM is user programmable as two 1024 byte buffers, four 512 byte buffers or eight 256 byte buffers. ASCII code and standard baud rates of 110 through 9600 asynchronous may be used.

Model 40 Controller

The Model 40 drives any Zeta high speed plotter at 3240 increments per second (maximum). Uses differential vector software and operates from 30/120 cps switchable ASCII. Combines with the Model 1200 plotter (1240 System) or 3600B Plotter (3640B System).

Built-In Controllers

An alternate means of plotting via timesharing is to use a plotter with a built-in timesharing controller. The **230 Series** provides a 12-inch plotter with a built-in remote controller designed expressly for the timesharing user. The wide acceptance of these dependable plotters has firmly established the **230 Series** as the industry standard for remote plotting.

The **Model 230B** provides maximum speed of 4.2 inches per second diagonally, 3 inches per second in axes, with 0.010 inch (10 mil) increment size. Operates up to 300 steps per second from 10/30 cps switchable ASCII.

The **Model 1453** includes the 1400 Series, 4 pen, 12" plotter with integral Model 53 microcomputer based controller. For detailed specifications see 1400, 53.

Zeta's comprehensive line of on-line controllers provides for parallel input and converts to the proper parallel plotter format. Cost effective plotting is provided by distributing computing to these controllers via GML software.

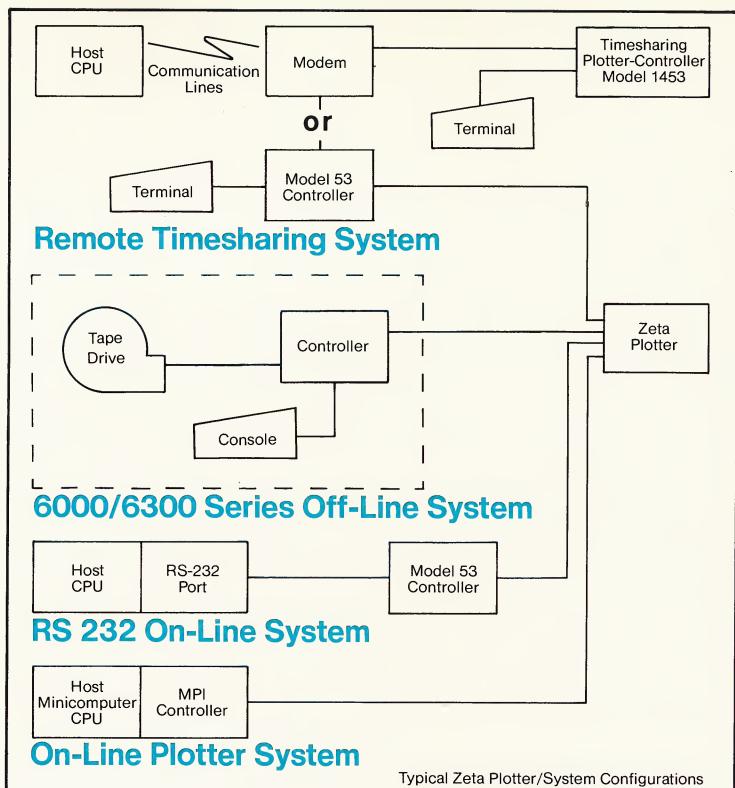
MPI Controllers

Zeta Minicomputer MPI Controllers are under development for many minicomputers. They are currently available for PDP-11, NOVA or Eclipse computers with the following operating systems:

- Date General NOVA & Eclipse
operating under RDOS, DOS & RTOS
- DEC PDP-11 operating under RT-11
RSTS/E, RSX-11M, RSX-11D, IAS,
UNIX, DOS-11 & PTS-11

MPI Controllers utilize the advantages of GML software.

A group of lower cost standard plug-in module interfaces are also available from Zeta for many computers including Digital Equipment, Hewlett-Packard, Data General and others. Additionally, many computer manufacturers have available industry standard plotter interfaces.



Off-Line Controllers

Series 6000

The Zeta 6000 Series off-line controller incorporates a general purpose computer as an integral operational system component. The controller consists of a tape transport and control electronics to which is added a Model 1200, 1400 or 3600S Plotter, thus providing a complete off-line plotting system.

A brownout-proof power distribution system is included which allows accurate plotting, even at extremely low power line voltages. The tape transport is a 10½ inch reel, 9-track, 800 cpi unit. Other industry standard head/density combinations are optionally available. The controller electronics include a tape formatter/controller and a PDP 11/04. A restyled TTY is provided for system communication. Ample room is provided in the rack cabinet for future expansion of the system. GML software is used with the 6000 Series Controller.

Model 6300 Controller

The Model 6300 provides the basis for a moderately priced plotting work station. The controller consists of a tape transport and control electronics to which is added any Zeta drum plotter, thus providing a complete off-line plotting system. Operator access to the system is provided by an operator console. The tape transport is a 10½ inch reel, 9-track, 800 cpi read and write unit.

A variety of options are available at the time of order including alternate industry standard tape transport head/density combinations and a communications interface which allows system communication via RS-232 lines.

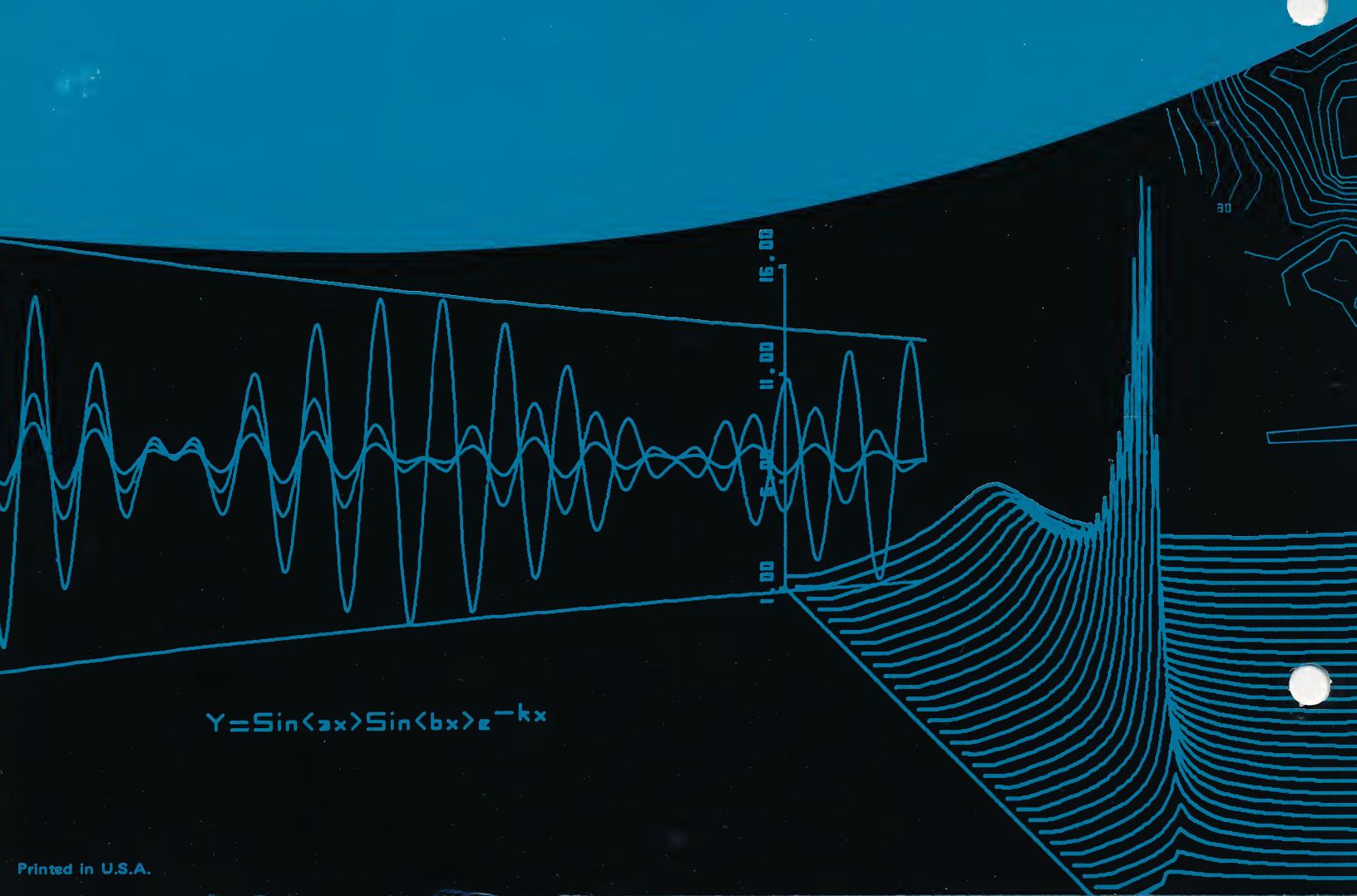
The communications interface option provides the ability to write tapes on the system directly via RS-232 lines and then, without removing or transporting the magnetic tape, plot off-line. Thus an on-line deferred/off-line plotting station can be easily configured.



Zeta Research

DIVISION OF NICOLET
INSTRUMENT CORPORATION

2300 Stanwell Drive • Concord • CA 94520 • TWX 910-481-5951 • TEL 415-671-0600



$$Y = \sin(ax) \sin(bx) e^{-kx}$$



Zeta

Model 3653 SX

Digital Drum Plotters



The New 3653SX With Smooth Line Drive™

- MICROCOMPUTER CONTROLLED
- FOUR PEN PLOTTING CAPABILITY WITH FULL PLOTTING AREA FOR ALL PENS
- 90° AXIS ROTATION
- EXCELLENT LINE QUALITY
- BALL POINT, LIQUID INK, NYLON TIP, and LIQUID ROLLER PENS
- SINGLE PLOT OUTPUT CAPABILITY (Option)
- ELECTRONIC MARGIN LIMITS WITH INDICATORS
- FAST PEN ACTUATION
- USER SELECTABLE SCALE
- VARIABLE SPEED CONTROL
- RETURNS TO LAST PLOTTED POSITION
- OUT OF PAPER WARNING INDICATOR
- BUILT-IN DUST ACOUSTIC COVER
- BUILT-IN STORAGE FOR PAPER AND PLOTTER ACCESSORIES

(Note: The above photo shows the model 3653SX plotter with the optional base cabinet.)



Zeta Research, Inc.

A SUBSIDIARY OF NICOLET
INSTRUMENT CORPORATION

2300 Stanwell Drive • Concord, CA 94520 • TWX 910-481-5951 • TEL 415—671-0600

MODEL 3653SX DESCRIPTION

The Zeta Model 3653SX is the newest member of our family of Digital Drum Plotters that offer maximum performance through the use of microcomputer control.

The 3653SX features high speed, up to 15 ips, superb line quality with .001 inch resolution; and four pens with a full plotting area of 34 inches by 120 feet for each pen.

The integral controller features Zeta's exclusive GML — Graphic Machine Language, and it is the most intelligent microcomputer based controller in the industry. The system is capable of remote, on-line or off-line operation.

The Model 3653SX is supported by a complete set of standard plotting subroutines which are available on most major timeshare services or computers to allow plotting from existing user programs.

The Model 3653SX offers excellent line quality, maximum throughput, accuracy and versatility.

SPECIFICATIONS

INPUT DATA

Model 3653SX includes integral buffered microcomputer controller

Model 3600SX has RS-232C input for ASC II encoded vector data or 6000 series off-line system input

RESOLUTION

.001 inch (0.025mm) — switch selectable/programmable resolutions of .002, .004, .005, .008, .010 inches.

MAXIMUM SPEED

15 ips on axis, 21 ips diagonal — front panel speed control 1.5-15 ips.

REPEATABILITY

Absolute

POSITIONING

Switch selectable return to last plotted position

PLOTTING AREA

34 inches x 120 feet (11 inches x 120 feet optional)

ACCELERATION

2g maximum

PAPER

Roll paper — industry standard formats

PENS

4 independent stations. Accommodates ball point, liquid ink, nylon tip, liquid roller pens

CONTROLS

Pushbutton Control Panel provides:

Power: On/Off Control

Pen Selection: Selects operation of 1 to 4 pens

Positioning: Pen and/or paper at any of three rates

Pause-run provides pause and continue at any time during plot

Single plot output capability

90 degree axis rotation

Scale:

X and/or Y operator scaling

Internal Control Panel provides:

Data rate selection

110-9600 baud asynchronous

POWER REQUIREMENTS

115/230 Vac $\pm 10^\circ$, 50-60 Hz, 500 watts

PHYSICAL SPECIFICATIONS

Standard: 17.5''H x 57''W x 25''D

With Base Cabinet: 47''H x 57''W x 25''D

OPTIONS

S01 — Provides for 230 volt power

P03 — Single plot output

P04 — Narrow paper adapter

P10 — Base Cabinet



INSIGHT
for financial
reporting, analysis
and modeling

INSIGHT

INSIGHT

INSIGHT

INSIGHT

INSIGHT

Into:

- Budgeting • P&L Forecasting
 - Financial Ratio Analysis
- Capital Budgeting • Cash Flow Analysis
 - Merger and Acquisition Analysis
 - Marginal Income • Lease vs. Buy
 - Long Range Planning
 - "What If" Financial Modeling

An advanced system for easy reporting and analysis of financial data

INSIGHT is unique: it is exceptionally powerful yet easy to use. Therefore, it is especially valuable to the financial executive without technical computer knowledge. You can easily and quickly produce financial statements, reports, budgets—promptly answering virtually any management request for financial information. You

can even create financial or "what if" models. Once operational, your INSIGHT applications can be run by your clerical staff.

INSIGHT's ease of use particularly stems from two special characteristics: 1) a very small number of "action" commands which fully and flexibly produce any desired result, and 2) the system's "prompt" feature which literally asks the user for the necessary inputs or required information.

On the other side of this data sheet are some of the many other outstanding features.



Time Sharing Resources, Inc.



INSIGHT—An advanced system for easy reporting and analysis of financial data.

Powerful report writing capability

Easy manipulation of headings, text insertions and data formats. Optional scaling, paging, and suppression of lines with no data.

Full alphanumeric and numeric identifiers

Individual data items may be identified by any number or name. Special "ID's" offer unique flexibility in reports and calculations.

Input data any way you want

Input line by line, column by column, or any other way you choose. Facilities are available for automatically repeating, spreading, or projecting data.

Calculations easily specified

Calculations may be specified as part of a line, column, or parameter definition. Your calculation sequence is automatically maintained by INSIGHT as well as determination of when and if calculations must be re-executed.

1977 BUDGET VARIANCE REPORT PREPARED FOR: NEW YORK SALES OFFICE				4:03 PM	
BUDGET	ACTUAL	CURRENT	Y-T-D		
2ND QTR	2ND QTR	% VAR	BUDGET	ACTUAL	Y-T-D % VAR
PAYOUT:					
520	540	(3.8)	WAGES AND SALARY	1,020	1,040 (2.0)
235	232	1.4	COMMISSIONS	459	447 2.6
25	30	(20.0)	OVERTIME	50	52 (4.0)
780	802	(2.8)	TOTAL PAYROLL	1,529	1,539 (0.7)
TRAVEL AND ENTERTAINMENT:					
35	37	(5.7)	TRAVEL	70	79 (12.9)
60	48	20.0	MEALS AND HOTEL	120	120 0.0
54	60	(11.1)	ENTERTAINMENT	104	105 (1.0)
149	145	2.7	TOTAL TRAV + ENT	294	304 (3.4)
OVERHEAD:					
50	50	0.0	RENT	100	100 0.0
10	15	(50.0)	HEAT + ELECTRICITY	25	35 (40.0)
22	25	(13.6)	OFFICE SUPPLIES	42	43 (2.4)
82	90	(9.8)	TOTAL OVERHEAD	167	178 (6.6)
1,011	1,037	(2.6)	TOTAL EXPENSES	1,990	2,021 (1.6)

Massive capacity

A half-million data cells plus up to 500 constants are available per file. Storage costs are based on actual use only.

Exceptional flexibility and control

One report may be applied to any number of files, any number of reports may be applied to one or more files. Data files are easily redefined including additions, insertions, resequencing, and changes to lines, columns or parameters

Special logics available

Special programs can be easily constructed to perform complex calculations or modeling.

Easy consolidations

Simple "action" command produces extensive consolidations. Data transfer from one file to another is easy and highly flexible.

Easy access to predefined routines

Public utility, financial and statistical routines are available and easy to access.

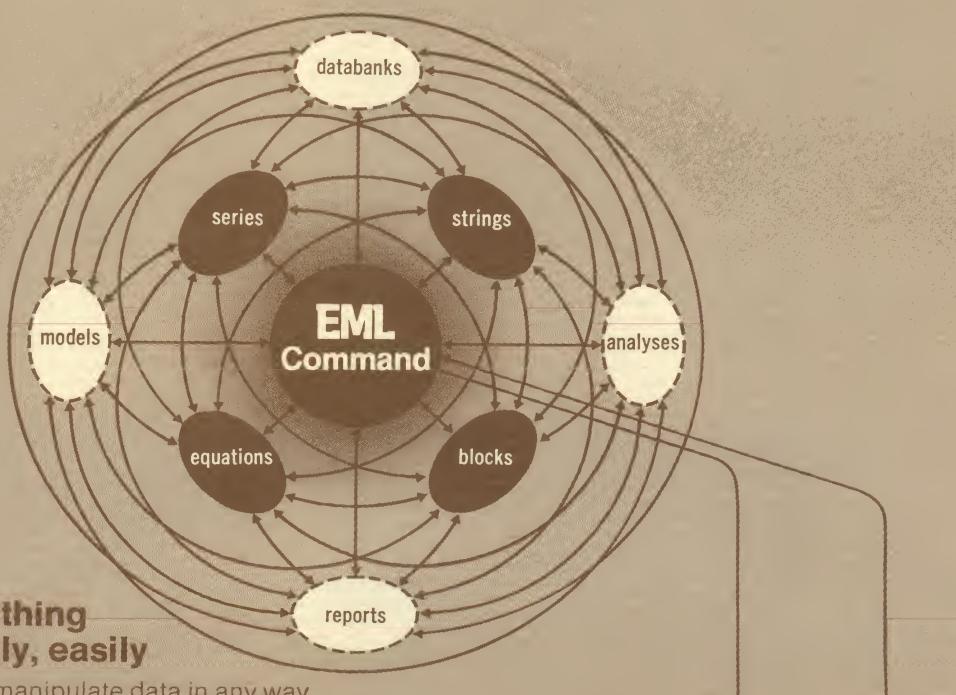
HYPOTHETICAL, INC. ALLOCATED INCOME ANALYSIS				
	CORPORATE	NEW YORK	CHICAGO	LOS ANGELES
SALES REVENUE	15,090	5,590	4,700	4,800
COST OF GOODS SOLD	5,309	2,124	1,487	1,699
SELLING EXPENSES	5,093	2,021	1,632	1,440
GENERAL + ADMIN.	1,280	512	358	410
DEPRECIATION + INTEREST	573	229	160	183
TOTAL EXPENSES	12,255	4,886	3,637	3,732
PROFIT BEFORE TAXES	2,835	704	1,063	1,068
INCOME TAXES	1,375	341	515	518
NET INCOME	1,460	363	547	550
RATIO ANALYSIS				
% NET INCOME/SALES	9.7	6.5	11.6	11.5
SALES % TOTAL		37.0	31.1	31.8
NET INCOME % TOTAL		24.8	37.5	37.7
ASSUMPTIONS				
CORPORATE TAX RATE		0.485		
NEW YORK ALLOCATION RATE		0.400		
CHICAGO ALLOCATION RATE		0.280		
LOS ANGELES ALLOCATION RATE		0.320		



Time Sharing Resources, Inc.
777 Northern Boulevard, Great Neck, New York 11021
Phone: 516 487-0101

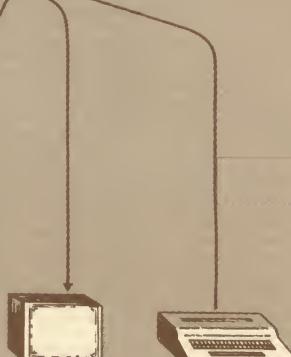
EML—A unique, powerful new language:

- simplifies complex jobs
- meets deadlines without strain
- makes mammoth tasks manageable
- highly cost effective



**You can do anything
with data quickly, easily**

EML makes it easy to manipulate data in any way you want to. You can model it, store it, report, print or plot it in any form—all with great ease. Only 20 commands are needed to cover 90% of all work done in time series analysis. Its secret is totality! All parts are inter-related, not disconnected. It's a complete, unified system, not a group of subsets, or subroutines.





Full display of entire databank library with one command

One command provides you with full databank inquiry, allowing extensive selection and display for all databank variables.

Data of any frequency, and text of any type, can be stored in same databank

You can organize databanks by project rather than by data type, and still retrieve data quickly and easily. Mixed data types and frequencies may be stored in the same databank—no need to segregate numeric and character data.

Automatic frequency conversion

Automatically convert totally different kinds of data with a single command. You choose frequency, EML chooses appropriate technique from memory.

Enormous time savings through strings and blocks

EML character strings eliminate long command sentences. EML blocks eliminate multiple command sentences or even eliminate entire sessions of manual keyboard entry. EML text editor permits complete control over all character information.

Faster, Easier Equation Handling

All EML regressions automatically create and name equations for later use in forecasting and modeling. No tedious, error-prone manual entry of equations. Entire models are easily re-estimated by a single command.

PLUS...

- Horizontal and vertical time axis for reports, prints, and plots.
- Compiled and ordered simultaneous models.
- Flexible row and column report layouts.
- EML workspace handles thousands of data items, and yet processing costs remain independent of workspace size.
- Fully integrated on-line help system.

PRINT [CBLOCK=QBL SPAN=76] PANDL						
XYZ CORPORATION ANALYSIS OF 1976 INCOME						
NET DOMESTIC SALES	QTR I	QTR II	QTR III	QTR IV	1976 T/A	% CHANGE
COST OF GOODS SOLD	4,335	4,642	4,723	4,942	18,642	7.2
	3,691	3,937	3,934	3,879	15,441	3.6
OPERATING INCOME	644	705	789	1,063	3,201	28.4

ECONOMIC FACTORS						
UNEMPLOYMENT RATE	7.6	7.5	7.8	7.9	7.7	-9.1
WHOLESALE PRICE INDEX	179.5	182.1	184.3	186.0	183.0	4.6



Contact your TSR representative for
demonstration without any obligation



Time Sharing Resources, Inc.
777 Northern Boulevard, Great Neck, New York 11021
Phone: 516 487-0101

CallDataTM

DTSS

**The Dartmouth
Time Sharing System
for
personalized computing**

Low-cost computing power for business, finance, engineering, research, government, and general users

In brief

With the CallData DTSS* (Dartmouth Time Sharing System), you can interactively access more than 500 business, scientific, engineering and educational applications – plus, of course, your own programs and databases.

The applications and much of the system software have been designed for users who, although expert in their own disciplines, are newcomers to electronic computing. For example, at your computer terminal you can type EXPLAIN COMMANDS and the computer will explain the function of computer commands and list the

commands available. You can then type EXPLAIN followed by a particular command and the computer will explain that command in detail. The same procedure can be followed with the category, TOPICS. Finally, much of the material contained in the basic CallData/DTSS manuals is online for immediate presentation at your terminal.

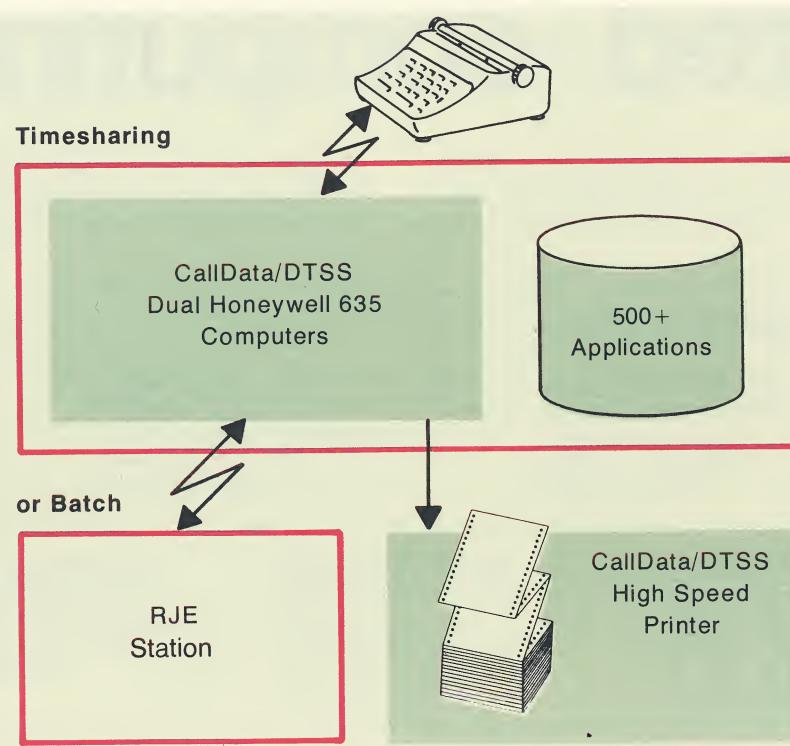
CallData/DTSS uses a dual Honeywell 635 computer system: two central processing units combined to perform one million instructions per second. On-line disks provide over 36 million words of storage for customer use, and other peripheral equipment includes tape drives, a

card reader, a card punch, and a 1200-line-per-minute printer. Through an interactive command mechanism, a background batch processing option permits volume output to your RJE station or to the CallData/DTSS high-speed printer.

Applications

CallData/DTSS has more than 500 on-line applications in business, engineering, scientific, financial, governmental and educational disciplines and in database management. A few of the many types of applications are:

- **Business programs**—Retailers can process orders, inventory, re-



Timesharing

CallData/DTSS features a simple command structure using English-language system commands. Most system messages include references to on-line EXPLAIN messages that explain the operation in process.

CallData/DTSS can also link many interactive terminals under program control for easy transaction processing, joint programming, and user communication.

Background batch processing

Background batch process frees the user's interactive terminal while lowering connect costs for long-running programs. All time sharing processors and files are available in this mode. Output can be routed to a remote printer, the CallData/DTSS printers, or to disk or tape.

ceivables, mailing lists, etc. by remote terminal. Bankers can use a completely computerized demand loans accounting system, project balance sheet and income statements, analyze investment portfolios, etc.

- **Engineering programs**—Fourteen programs are available for such common engineering requirements as calculating Fourier transforms, gas properties, heat transfer, etc..
- **Scientific programs**—More than twenty-five mathematical function and numerical analysis programs are available for scientific calculations such as solutions to Bessel's differential equations, Debye and Einstein functions for energy studies, LeGendre symbol evaluations, etc..
- **Financial analysis programs**—In addition to the banking programs involving financial analysis, a number of programs are available for such functions as financial modeling and projection, analysis of mortgage and leasing programs, risk analysis, etc..
- **Government programs**—Sets of programs are available for such local government functions as payroll records, water billing, property tax billing, highway engineering, school system salary analysis, etc..
- **Educational programs**—Hundreds of educational programs are available in such diverse fields as anthropology, earth science, linear algebra, number theory, social science, etc.
- **Database management programs**—In addition to the general purpose FIND system, database management programs have been specifically designed for such functions as analyzing a bank's financial records and analyzing and comparing the financial operations of a number of corporations over a period of time.

In addition, most programs that run under Honeywell's General Comprehensive Operating Supervisor (GCOS) can be run under a set of DTSS background modules that simulate the GCOS environment. These modules enhance GCOS to provide these features:

- Ability to submit GCOS jobs from a CallData terminal and to use on-line editing
- Improved error-detection and re-

porting, including immediate reporting of errors encountered during job submission and detailed error diagnostics following program aborts

- Interim progress reports describing the initiation and completion of each phase of the job.

File system

Various programming languages can manipulate terminal format files (ASCII) and binary files. The binary files can be accessed sequentially or randomly. There is no limit on file size and the user controls all access privileges. With authorized access, files stored under other user numbers may be accessed and modified. Access permissions include append, fetch, list, group and public. All access privileges are controlled by the owning user. All information about a file (access privilege, system, size, etc.) is available interactively to the controlling user through an extensive set of "catalog" commands.

Languages and Processors

The CallData/DTSS system has a variety of interactive language processors:

- | | |
|-----------|----------|
| ● BASIC | ● LISP |
| ● COBOL | ● SNOBOL |
| ● FORTRAN | ● XPL |
| ● DYNAMO | ● CPS |
| ● APL | ● GMAP |
| ● ALGOL | ● SORT |

The BASIC, COBOL and FORTRAN compilers are single-pass, compiling directly into core and then relocated with the run time package when the program is to be executed.

Powerful text editing

CallData/DTSS provides four different editors for different requirements:

- EDIT—To edit line-numbered files
- TEXT—To edit simple character strings
- STRING—For sophisticated character-string editing (provides for regular string expressions) and file execution
- QED—For quick character-string editing, simple one-letter commands, abbreviated structure

Communications

CallData/DTSS is available nationwide. A variety of line speeds can accommodate both conversational and batch terminal equipment, including teletypewriters, CRT and hard-

copy terminals, plotters, and optical-input devices.

Operating hours

CallData/DTSS is available 21 hours per day, seven days per week. Accessibility now averages 99.5 per cent of schedule, and maintenance is limited to about three hours a day, usually from about 4 a.m. to 7 a.m..

Technical support

We provide both initial and on-going support to help you enter the system and to keep you operating at maximum efficiency. The initial orientation support includes sign-on procedure, file system, CallData/DTSS utilities, libraries, languages, telecommunications, and system accounting.

Casual on-going technical support is, like initial support, free of charge. Our technical representatives have had extensive consulting experience and can solve a wide range of computing problems. If, however, expertise in a particular area is required, we will refer you to a CallData specialist.

Billing

Since the system is very fast both in execution time and in response to commands, connect and usage costs are low. Billing is by user number, and typing the command BILL will present your up-to-date account status on your terminal.

Privacy

Privacy is assured by password protection of your user number, with options for additional individual file security. Since the passwords for individual files are not stored in the system, security cannot be compromised by programming techniques.

Competitive pricing

To prove that we can do a better job for you, we're ready to benchmark your typical jobs at no expense. With the results of the benchmark in hand, you can judge for yourself the

- Cost/effectiveness of the Call Data/DTSS service
- Quality of our technical support and other services

We stand by our performance, and we're more than ready to be judged by it.

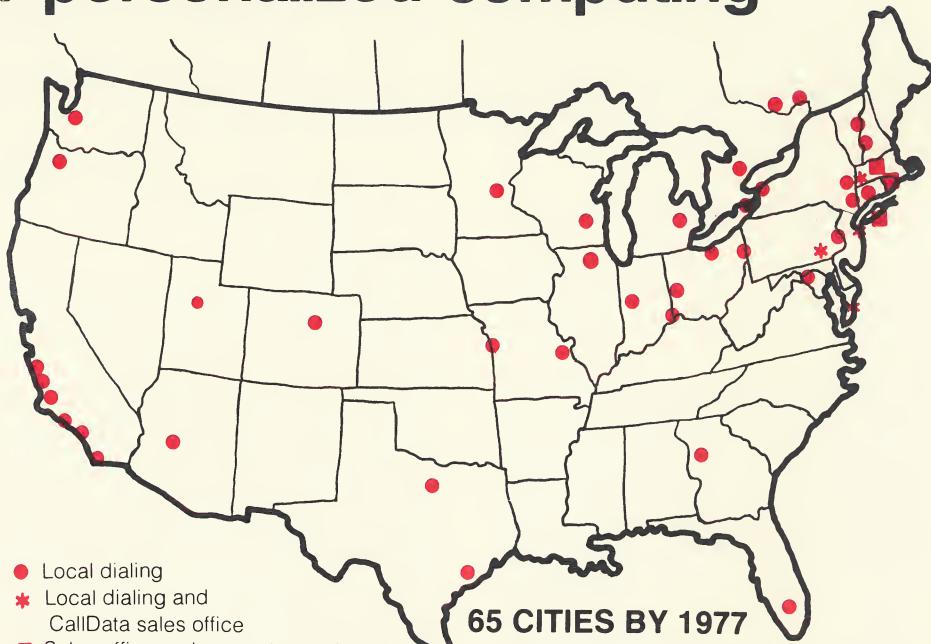
CallData: for personalized computing

Since its founding in 1970 as a subsidiary of the Grumman Corporation, Grumman Data Systems Corporation (creator of CallData) has grown to be one of the largest computer services and software contractors in the industry. As a result of this success, CallData Systems, Inc. was organized as a Grumman Data Systems subsidiary in July 1975 to increase flexibility in satisfying the general computer services market. With a combined staff of more than 1200 who know the capabilities of the equipment and understand the EDP needs of today's business, engineering, scientific and educational communities, we have continually expanded our capabilities in:

- Remote computing services
- Commercial, engineering and scientific applications
- Educational computer services
- System analysis, design and programming
- Microfilm services
- Automated publication services

...and allied areas. With this expertise, we have pioneered in hardware and software developments, customized on-line computer systems, enhanced timesharing, and proprietary software products and we are ready to meet the changing demands on data processing from its universe of users.

CallData offers one of the largest, most diversified non-government computer facilities in the eastern U.S.



● Anaheim	● Columbus	● Kansas City	● Ottawa	● San Diego
● Atlanta	● Dallas	● Los Angeles	● Palo Alto	● San Francisco
● Baltimore	● Denver	● Manchester	* Philadelphia	● San Jose
■ Boston	● Detroit	● Miami	● Phoenix	● Seattle
● Bridgeport	* Hamden	● Milwaukee	● Pittsburgh	● Stamford
● Buffalo	● Hanover	● Minneapolis	● Portland	● Toronto
● Chicago	● Hartford	● Montreal	● Rochester	■ Waltham
● Cincinnati	● Houston	* New York	● St. Louis	* Washington
● Cleveland	● Indianapolis	● Newark	● Salt Lake City	■ Woodbury

Our present equipment inventory consists of the following: IBM Models 370/158 OS/VS, 370/155M2 VM/CMS, 370/168 VS; CDC CYBER/73 Telescope; triple DEC SYSTEM-10's; dual Honeywell 635/DTSS.

As the commercial arm of Grumman Data Systems, CallData can call on other Grumman Corporation research

capabilities and scientific, engineering, and commercial resources. Chief among these are the Grumman Aerospace Corporation, whose facilities are near our own. Others include Grumman Ecosystems Corporation, Grumman American Aviation Corporation, Grumman Allied Industries, Inc., Paumanock Leasing Services, Inc., and our immediate parent, Grumman Data Systems Corporation.

SALES OFFICES

NEW YORK CITY
CallData System, Inc.
1180 Avenue of the Americas
New York, NY 10036
(212) 764-1180

WASHINGTON, D.C.
CallData Systems, Inc.
1800 N. Kent Street
Arlington, VA 22209
(703) 527-7722

BOSTON, MASS.
Systematic Data Processing Services, Inc.
A Subsidiary of CallData Systems Inc.
131 Tremont Street
Boston MA 02111
(617) 423-6780

LONG ISLAND, N.Y.
CallData Systems, Inc.
280 Crossways Park Drive
Woodbury, NY 11797
(516) 575-3282

WALTHAM, MASS.
Systematic Data Processing Services, Inc.
A Subsidiary of CallData Systems, Inc.
400 Totten Pond Road
Waltham, MA 02154
(617) 890-1200

NORWALK, CONN.
Systematic Data Processing Services, Inc.
A Subsidiary of CallData Systems Inc.
69 East Avenue
Norwalk, CT 06851
(203) 853-4922

PHILADELPHIA, PA.
CallData Systems, Inc.
Suite 914
Broad and 1346 Chestnut Street
Philadelphia, PA 19107
(215) 545-5600

CallData™

CallData Systems, Inc., 20 Crossways Park North, Woodbury, New York 11797 (516) 575-5650
A subsidiary of Grumman Data Systems Corporation, Bethpage, NY

CallDataTM

TS*RJE/Timesharing

**Timesharing
on an IBM 370/VM-CMS
with optional
batch processing**

Interactive responsiveness with batch economy

In brief

With the CallData TS*RJE/Timesharing system, your terminal is effectively transformed into a "virtual computer" with which you can command the entire resources of our IBM 370/VM-CMS system. However, timesharing permits the cost of this system to be distributed among as many as 100 simultaneous users, and you pay only for the actual system functions you have used.

In addition to low cost, the benefits of the CallData TS*RJE/Timesharing system include:

- Optional batch processing via the TS*RJE link
- Numerous application packages and libraries
- Effective on-line debugging of new programs

- Complete documentation
- Many programming languages
- Versatile terminal/communications support
- Extended operating hours
- Free technical support
- User-specified turnaround on optional batch processing

With these facilities at your command, you will get precisely the service you need at a highly competitive cost.

Typical applications

• Engineering

- MSC/NASTRAN for complex structural analysis*
- SCEPTRE for design and analysis of electronic circuits*

• Database management

MARK IV An advanced system that can, in a single run, read input files, generate output files, and prepare several hundred reports.*

SYSTEM 2000 A general-purpose system with a user-oriented language for easy access by non-programmers.*

DASH The easy-to-use highspeed system that records, displays, and analyzes information of virtually any type and quantity.

• Management science

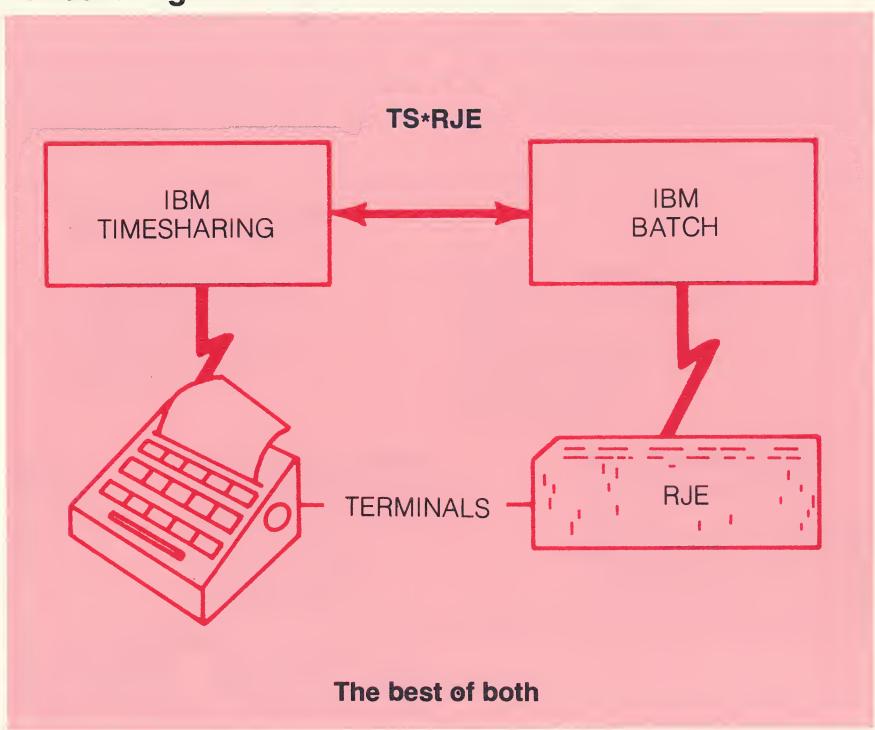
MPSX A mathematical programming system language that includes a control program and compiler, a set of linear programming procedures, and a FORTRAN interface.*

TS*RJE combines the best features of batch and interactive processing into one total service. Thus you have the interactive editing and debugging advantages of TS*RJE/Timesharing plus, at your option, the power and economy of batch processing of our TS*RJE/Batch. With this combination you obtain more:

- Economy
- Efficiency
- Flexibility
- Computing power

Simple commands issued to TS*RJE/Timesharing will automatically generate a VS jobstream and transfer the job to TS*RJE/Batch for low-cost execution. The output may be received at your conversational terminal (in whole or in part) or directed to a highspeed RJE terminal, the CallData Computer Center, or to disk storage on either TS*RJE system.

Timesharing and batch



PMS and PROJECT/2 State-of-the-art project management systems with facilities for controlling schedules, costs and resources via a wide variety of reporting and graphic media.*

• Program development

Interactive COBOL and FORTRAN debuggers can drastically reduce the time and cost of program development.

Other application disciplines include interactive graphics, plotting, mathematical and statistical libraries, utilities, and business and financial programs.

Free benchmarking

We think we can do a better job for you at less cost, and we're ready to prove it by benchmarking one of your typical jobs at no expense to you. With the benchmark in hand, you can judge for yourself the:

- Savings in time and money
- Quality of our technical support and other related services

We stand by our performance, and we're more than ready to be judged by it.

Technical support

We provide both initial and on-going support to help you in entering the system and to keep you operating at maximum efficiency. The initial orientation seminar presents sign-on procedures, cataloged procedures, IBM utilities, CallData utilities, the TS*RJE feature, libraries and languages, and accounting procedures.

Casual on-going technical support is, like initial support, free of charge. Our technical representatives have had extensive computing experience and can solve a wide range of problems. If, however, expertise in a particular area is required, our represen-

tative will refer you to a CallData specialist in that area.

Languages and processors

CallData TS*RJE/Timesharing supports these languages and processors:

- FORTRAN IV
(G, G1, H, H
EXT)
- ASSEMBLER
(F, G)
- VS COBOL*
- COBOL (F,
ANS IV)
- PL/1 V5 and
OPTIMIZER*
- GPSS-II
- BASIC
- RPG
- CSMP III*
- DYNAMO
- SCRIPT

Others may be available upon request. A complete library of utilities is also available.

Operating hours

We provide computer service 22 hours a day-Monday through Saturday-with limited service on Sunday. Full coverage of over-the-counter and support services is also provided at certain CallData District Offices for similar time periods. Technical Support is available Monday through Friday for your use at the CallData terminal facilities at our district sales offices. Special requirements can be accommodated upon advance notice.

Versatile terminal support

CallData TS*RJE supports all terminals functionally equivalent to the following:

- ASR/KSR
33, 35
- DCT 500
- DATEL
- Data 100
- IBM 1130,
2780, 3780, 360/20
- GE Terminet 300
- Hazeltine
2000 CRT
- Novar
- COPE 1200

You have the choice of these line speeds for Timesharing and RJE:

- CPS: 10,15,30,120
- BPS: 2000, 2400, 3600, 4800, 9600

Complete on-line I/O control

Since the user can call on all CallData TS*RJE peripheral equipment (tape drives, printer, punch, reader, etc.), he has at his disposal in the timesharing mode all the resources normally available only in batch processing.

Billing

Maximum data processing usage is provided at minimum possible cost. Charges accrue only when the system is used, and only for that portion of the system being used. Moreover, you are furnished with detailed monthly usage reports which, at your request, can be allocated by your project or department designation. The CallData GO*PAC™ accounting program and a proprietary financial reporting system are used to assure concise and accurate cost reporting.

Powerful context editing

The programmer can modify, update, delete, split and append information stored in user data and program files—features particularly useful when removing syntax errors from source programs and updating private databases. An editing command can be applied to one line or, if required, to the entire file.

Easy software development

Since every programmer has immediate access to all CallData TS*RJE capabilities, including interactive debugging, he can usually cut his software development time by a factor of 5. With his "virtual computer" he can monitor interactively the execution of his program, intervening immediately when necessary. Final testing of large batch applications can then be executed most economically on the TS*RJE/Batch system.

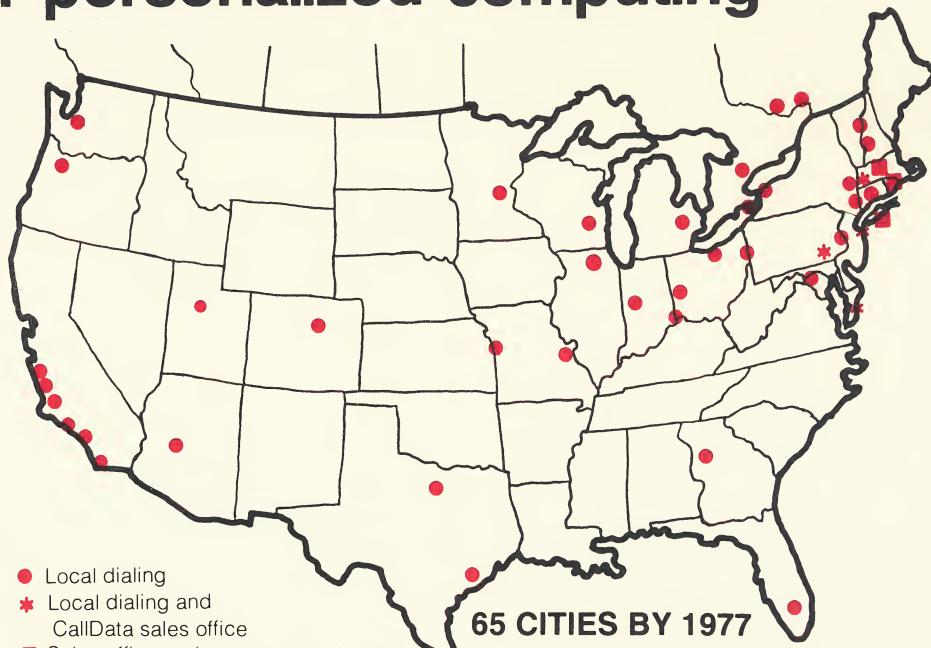
CallData: for personalized computing

Since its founding in 1970 as a subsidiary of the Grumman Corporation, Grumman Data Systems Corporation (creator of CallData) has grown to be one of the largest computer services and software contractors in the industry. As a result of this success, CallData Systems, Inc. was organized as a Grumman Data Systems subsidiary in July 1975 to increase flexibility in satisfying the general computer services market. With a combined staff of more than 1200 who know the capabilities of the equipment and understand the EDP needs of today's business, engineering, scientific and educational communities, we have continually expanded our capabilities in:

- Remote computing services
- Commercial, engineering and scientific applications
- Educational computer services
- System analysis, design and programming
- Microfilm services
- Automated publication services

...and allied areas. With this expertise, we have pioneered in hardware and software developments, customized on-line computer systems, enhanced timesharing, and proprietary software products and we are ready to meet the changing demands on data processing from its universe of users.

CallData offers one of the largest, most diversified non-government computer facilities in the eastern U.S.



● Anaheim	● Columbus	● Kansas City	● Ottawa	● San Diego
● Atlanta	● Dallas	● Los Angeles	● Palo Alto	● San Francisco
● Baltimore	● Denver	● Manchester	* Philadelphia	● San Jose
■ Boston	● Detroit	● Miami	● Phoenix	● Seattle
● Bridgeport	* Hamden	● Milwaukee	● Pittsburg	● Stamford
● Buffalo	● Hanover	● Minneapolis	● Portland	● Toronto
● Chicago	● Hartford	● Montreal	● Rochester	■ Waltham
● Cincinnati	● Houston	* New York	● St. Louis	* Washington
● Cleveland	● Indianapolis	● Newark	● Salt Lake City	■ Woodbury

Our present equipment inventory consists of the following: IBM Models 370/158 OS/VS, 370/155M2 VM/CMS, 370/168 VS; CDC CYBER/73 Telescope; triple DEC SYSTEM-10's; dual Honeywell 635/DTSS.

As the commercial arm of Grumman Data Systems, CallData can call on other Grumman Corporation research

capabilities and scientific, engineering, and commercial resources. Chief among these are the Grumman Aerospace Corporation, whose facilities are near our own. Others include Grumman Ecosystems Corporation, Grumman American Aviation Corporation, Grumman Allied Industries, Inc., Paumanock Leasing Services, Inc., and our immediate parent, Grumman Data Systems Corporation.

SALES OFFICES

NEW YORK CITY
CallData System, Inc.
1180 Avenue of the Americas
New York, NY 10036
(212) 764-1180

WASHINGTON, D.C.
CallData Systems, Inc.
1800 N. Kent Street
Arlington, VA 22209
(703) 527-7722

BOSTON, MASS.
Systematic Data Processing
Services, Inc.
A Subsidiary of CallData Systems Inc.
131 Tremont Street
Boston MA 02111
(617) 423-6780

LONG ISLAND, N.Y.
CallData Systems, Inc.
280 Crossways Park Drive
Woodbury, NY 11797
(516) 575-3282

WALTHAM, MASS.
Systematic Data Processing
Services, Inc.
A Subsidiary of CallData Systems, Inc.
400 Totten Pond Road
Waltham, MA 02154
(617) 890-1200

NORWALK, CONN.
Systematic Data Processing
Services, Inc.
A Subsidiary of CallData Systems Inc.
69 East Avenue
Norwalk, CT 06851
(203) 853-4922

PHILADELPHIA, PA.
CallData Systems, Inc.
Suite 914
Broad and 1346 Chestnut Street
Philadelphia, PA 19107
(215) 545-5600

CallData™

CallData Systems, Inc., 20 Crossways Park North, Woodbury, New York 11797 (516) 575-5650
A subsidiary of Grumman Data Systems Corporation, Bethpage, NY

Printed in U.S.A.

**All-purpose
timesharing:
Triple
DECSYSTEM-10's**

Triple DECSYSTEM-10's for

Comprehensive DP

In brief

With the CallData **CompUtility** timesharing system, you effectively command the total resources of our triple DECSYSTEM-10 computers. However, time sharing permits the cost of this system to be distributed among as many as 100 simultaneous users, and you pay only for the system functions you have actually used.

In addition, the benefits of the **CompUtility** system include:

- Numerous application packages and libraries
- Effective on-line debugging of new programs
- Complete documentation
- Many programming languages
- Versatile terminal/communications support
- Extended operating hours
- Experienced technical support
- Minimum-cost background (batch) processing
- National communications network

With these facilities at your command, you will have precisely the service you need at a highly competitive price.

Applications

CompUtility has scores of application

programs to satisfy the requirements of most users. Typical of these are:

● Minicomputer assemblers and simulators

PAL-10 — A PDP-8 assembler
MACY-10 — A PDP-11 assembler
NOMAC — A NOVA assembler
SIM-8 — A PDP-8 simulator
SIM-11 — A PDP-11 simulator
NOVASM — A NOVA simulator

● Engineering - Civil

HYDNET — For hydraulic network analysis
STRAIN — For system stress analysis
XCOGO — For coordinate geometry studies

● Engineering - Electrical

ACAP — For linear circuit analysis
AMCAP — For analysis of microwave networks
COMPACT — For analysis and optimization of microwave networks
ITRAC-II — For transient circuit analysis
MIFIL — For design of bandpass filters

● Financial

CUFFS — For financial forecasting and modeling. Notably easy to use and adaptable to a variety of modeling applications.

● Information Management

IMARS — Designed for ease of use by non-programmers, this application features simple database definition, flexible data retrieval, simple data updating, and multiple report output.

● Management

CPM — A total critical path management system

PERPAK — Complete personnel data management, including total EEO report capability.

PERT6 — A complete project management reporting system

● Mathematics

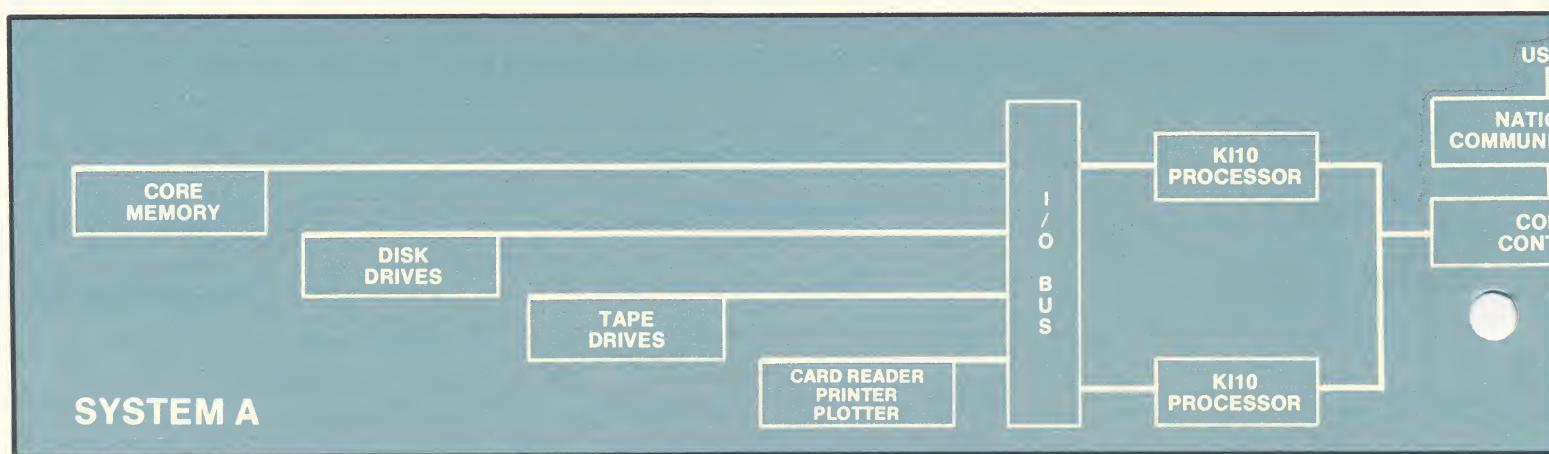
MATHPAK — A variety of mathematical routines to solve functions precisely.
STATPAK — A collection of statistical routines including: cross tabulation; multiple regression; factorial design; mean; standard deviation; standard error; maximum; minimum; range; etc.

● Plotting

A collection of routines for plotting at the user's terminal.

● Text editing

LINED — A simple line-oriented editing language



SOS — An augmented version of STOPGAG text editor
SNAP — A complete text editor for beginners and experienced users.
TECO — A powerful text editor for sophisticated string editing.

Communications

Connected to a national network service, **CompUtility** service is available throughout the United States by a simple local telephone call. Terminals can use line speeds from 110 Baud to 1200 Baud and off line remote job entry is available at higher speeds.

Languages and processors

CompUtility supports these languages processors:

- BASIC
- SBASIC
- FORTRAN-IV
- FORTRAN-10
- COBOL
- ALGOL
- LISP
- MACRO
- SIMULA

Others may be available upon request. A complete library of utilities is also available.

Free benchmarking

Most computer service organizations can do most data processing jobs after a

fashion. For you, the difference among them is how well, how quickly, how economically your work is done. We think we can do a better job for you at less cost, and we're ready to prove it by benchmarking one of your typical jobs (perhaps using one of our application programs) free of charge. With the results of our service in hand, you can judge for yourself the

- Savings in time and money
- Quality of our technical support and related services

We stand by our performance, and we're more than ready to be judged by it.

Operating hours

The CallData **CompUtility** service is available 162 hours per week, with six hours a week (usually Saturday night between midnight and 6 a.m.) scheduled for maintenance. Full support services are provided at our district offices for up to 16 hours a day. Special requirements can be accommodated upon advance notice.

Technical support

CallData provides both initial and on-going technical support to help you enter the system and operate at maximum efficiency. The initial orientation seminar presents sign-on procedures, editing, file

handling, languages, utilities, applications, and the accounting procedure.

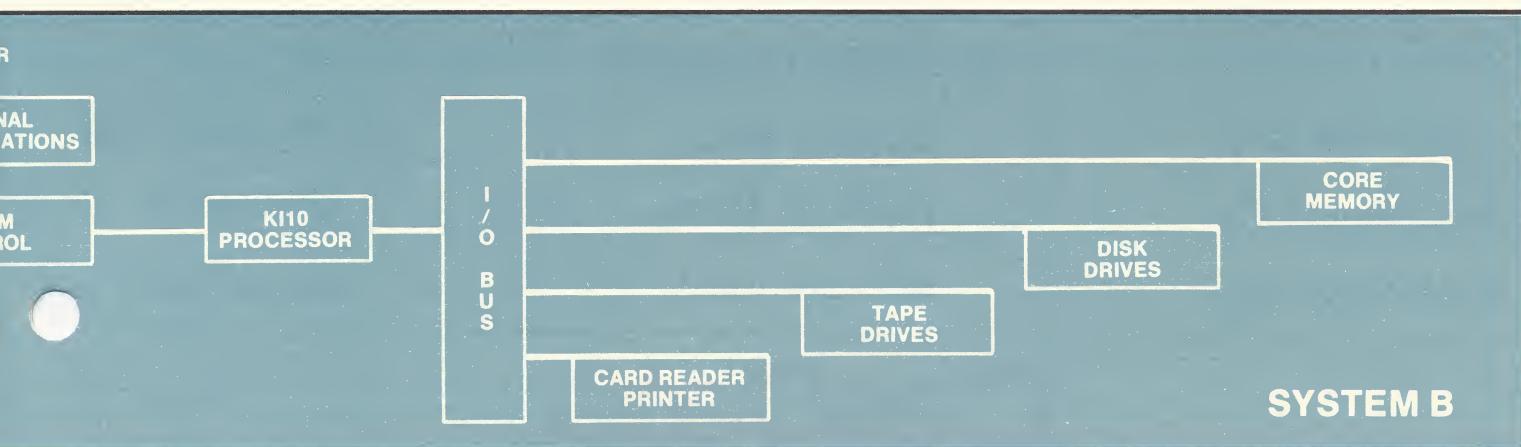
Casual on-going support is, like initial support, free of charge. Our technical representatives have had extensive computing experience and can solve a wide range of problems. If, however, expertise in a particular area is required, our representative will refer you to a CallData specialist in that area.

Detailed billing

Maximum data processing usage is provided at minimum possible cost. Charges accrue only when the system is used, and only for that portion of the system being used. Moreover, you are furnished with detailed monthly usage reports which, at your request, can be allocated by project or department designation.

Rapid software development

Since every user has immediate access to all **CompUtility** capabilities, including interactive debugging, he can usually cut his software development time drastically. He can monitor interactively the execution of his program, intervening immediately when necessary. Final testing and extensive production runs of large programs can then be executed most economically in the background (batch) mode of operation.



CallData: for personalized computing

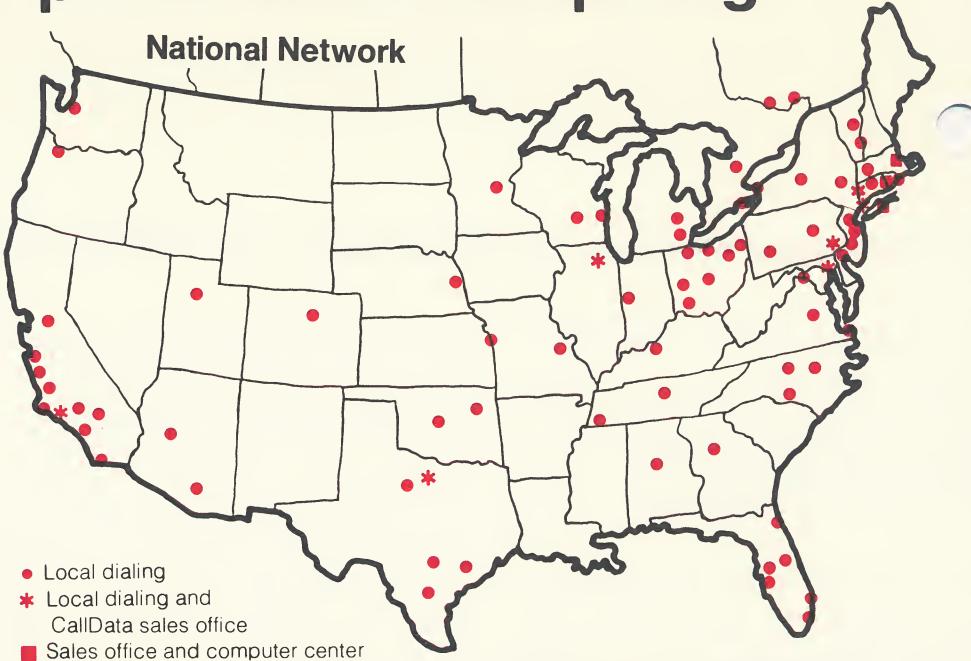
Since its founding in 1970 as a subsidiary of the Grumman Corporation, Grumman Data Systems Corporation (creator of CallData) has grown to be one of the largest computer services and software contractors in the industry. As a result of this success, CallData Systems, Inc. was organized as a Grumman Data Systems subsidiary in July 1975 to increase flexibility in satisfying the general computer services market.

CallData offers one of the largest, most diversified non-government computer facilities in the eastern U.S., including Amdahl, CDC, DEC, Honeywell and IBM systems. With a combined staff of more than 1200 who know the capabilities of the equipment and understand the EDP needs of today's business, engineering, scientific and educational communities, we have continually expanded our capabilities in:

- Remote computing services
- Commercial, engineering and scientific applications
- Educational computer services
- System analysis, design and programming
- Microfilm services
- Automated publication services

...and allied areas. With this expertise, we have pioneered in hardware and software developments, customized on-line computer systems, enhanced timesharing, and proprietary software products and we are ready to meet the changing demands on data processing from its universe of users.

As the commercial arm of Grumman Data Systems, CallData can call on



Akron	Dayton	Milwaukee	Phoenix	Seattle
Allentown	Denver	Minneapolis	Pittsburg	Springfield
Anaheim	Detroit	Montreal	Portland	Stamford
Ann Arbor	Fort Lauderdale	Nashville	Providence	Syracuse
Atlanta	Fort Worth	*New York	Raleigh/Durham	Tampa
Austin	Hanover	Newark	Richmond	Toledo
Baltimore	Hartford	Norfolk	Rochester	Toronto
Birmingham	Houston	*Norwalk	Sacramento	Trenton
Boston	Indianapolis	Oklahoma City	Saint Louis	Tucson
Bridgeport	Jacksonville	Omaha	Saint Petersburg	Tulsa
Buffalo	Kansas City	Orlando	Salt Lake City	Waltham
Charlotte	*Los Angeles	Ottawa	San Antonio	Washington
Chicago	Louisville	Oxnard/Ventura	San Bernardino/Riverside	Wilmington
Cincinnati	Madison	Palo Alto	San Diego	Winston-Salem/Greensboro
Cleveland	Manchester	Pasadena	San Francisco	Woodbury, L.I.
Columbus	Memphis	Paterson/Passaic	San Jose	Youngstown
*Dallas	Miami	*Philadelphia		

other Grumman Corporation research capabilities and scientific, engineering, and commercial resources. Chief among these are the Grumman Aerospace Corporation, whose facilities are near our own. Others

include Grumman Ecosystems Corporation, Grumman American Aviation Corporation, Grumman Allied Industries, Inc., Paumanock Leasing Services, Inc., and our immediate parent, Grumman Data Systems Corporation.

Sales Offices

Woodbury, Long Island

New York City

Philadelphia, Pa.

Washington, D.C.

Boston, Mass.

Waltham, Mass.

Norwalk, Conn.

Los Angeles, Calif.

Chicago, Ill.

Dallas, Texas

CallData™

CallData Systems, Inc., 20 Crossways Park North, Woodbury, New York 11797 (516) 575-5650
A subsidiary of Grumman Data Systems Corporation, Bethpage, NY 11714

Project managers:

For the first time integrate all variables in one personalized control system.

Today there are at least 10 project management systems available to you. Only one—ProSys/80™—fully meets current needs of project managers.

Compared to the most widely used system, ProSys/80 has lower hardware costs, using far less core. It handles more activity relationships. Runs faster. Offers better documentation. Requires no significant computer experience to run.

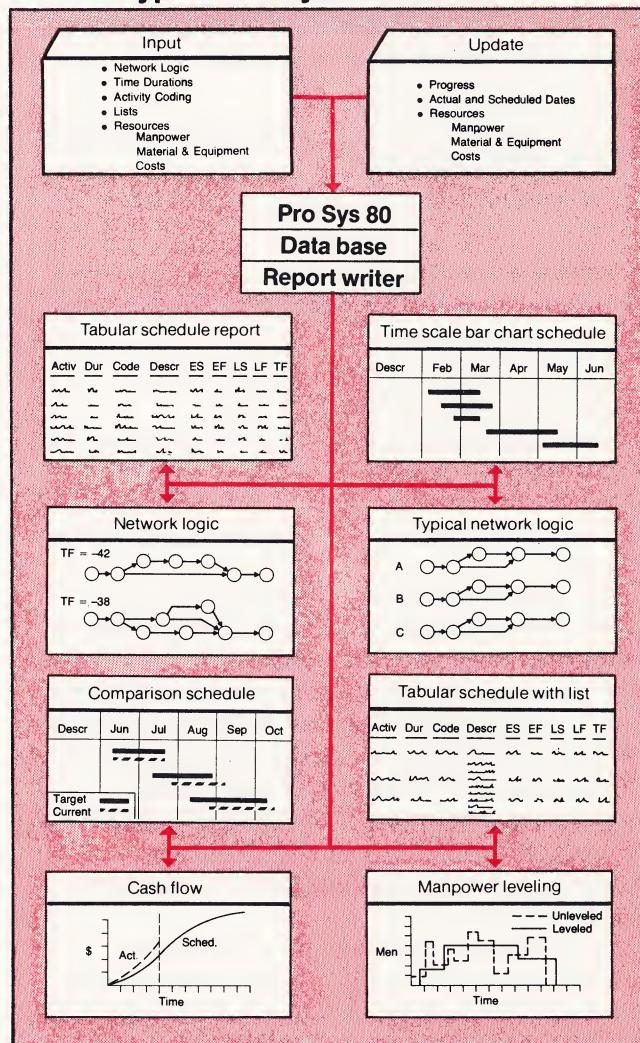
ProSys/80 effectively integrates project scheduling, cost control, accounting, resource leveling, forecasting, performance measurement and data base management. The user may choose only those modules he needs for a given project.

This modularity gives ProSys/80 major advantages over all competition. It allows rapid customization at low cost, users specifying their unique input, output and computational requirements. ProSys/80 is English-language oriented, documented for the end user, can be easily linked to other systems and may be used through a wide variety of conversational remote terminal devices in a timesharing and/or batch processing environment.

Unlike most other project management systems, you can sublicense ProSys/80 from CallData: lease, rent or purchase. Run ProSys/80 on your own computers (it's easy to install on most makes). Or run it on CallData's own nationwide IBM/370 TS*RJE remote computing network.

For a complete, competitive look at ProSys/80, contact your local CallData office, below. Or contact Kurt Thoss, CallData Systems, Inc., 20 Crossways Park North, Woodbury, NY 11797. 516-575-3298. A Grumman company.

Typical ProSys 80 modules.



ProSys/80 is a trademark of CallData Systems, Inc.
ProSys/80 was developed by Elite Data Systems, Inc.

CallDataTM
Personalized services: you grow, we grow.

Waltham, Mass.	New York	Atlanta	Boston	Philadelphia	Long Island	Washington	Norwalk, Conn.	Los Angeles
Al Drole 617 890-1200	Joe Frank 212 764-1180	Dave Harte 404 346-0501	Steve Saunders 617 423-6780	Mike Yankovich 215 545-5600	Bob Engler 516 575-3282	George Dill 703 527-7722	Ken Lee 203 853-4922	Jim Gajniak 213 986-6490

Microprocessor system designers:

Now our wide range of cross-assemblers and simulator-debuggers will save you time and money.

You have four options for cross-assembly:

- Ask your chip manufacturer for help.
- Work in machine language.
- Buy or develop your own cross-assembler software for your host computer.
- Use CallData's proven cross-assemblers.

The first three options are slow or high cost. Or both! But our cross-assemblers are available right now at minimum cost.

We offer industry's widest range of cross-assemblers. Note our offering at right.

How good are they? We make it no secret: we offer the complete and constantly expanding group of cross-assemblers from the Boston Systems Office, Inc., the industry leader in microprocessor software systems.

Our cross-assemblers offer: full macro and conditional capabilities; input and output formats identical to those specified by your chip manufacturer; optional output formats; an extensive error capability, both in assembly listing and at user's terminal; normal arithmetic expression capability; mnemonics for data manipulation and jumps to subroutines. Also, integrated symbolic simulator debuggers are offered for most major microprocessors. They allow programs to be tested, independent of hardware development.

By developing microprocessor software on CallData's timesharing system, your costs will be minimal. You'll access our computers through an 85-city local-dialing network. Your network and computer

Microprocessor cross-assemblers now available.

Intel 8008, 8080, 4004, 4040, 8048, 8035, 8748 and 8085

Motorola M6800

National Semiconductor PACE

Texas Instruments 9900 and 1000 series

MOS Technology 6500 series

Fairchild F8

Rockwell PPS/8

ZILOG Z80

Also, any microprocessor compatible with the above, such as:

Mostek F8, Z80

AMI SM6800

TITMS 8080, NEC

μPD 8080A, NSC 8080A

timesharing costs will be on a use-only basis. You'll be on our CompuUtility timesharing system... a triple DecSystem-10 which has been demonstrating its response capability for nearly ten years.

Cross-assembling microprocessor software on the CompuUtility timesharing network is far less costly than in-house work, if you are completely objective about in-house costs. To be sure, check us out.

Call your CallData representative at the nearest office listed below. Or contact Dave Grynberg at CallData Systems, Inc., 20 Crossways Park North, Woodbury, New York 11797. (516) 575-5650. A Grumman company.

CallDataTM

Personalized services: you grow, we grow.

Waltham, Mass. **New York**
Al Droke
617 890-1200

Joe Frank
212 764-1180

Atlanta
Dave Harte
404 346-0501

Boston
Steve Saunders
617 423-6780

Philadelphia
Mike Yankovich
215 545-5600

Long Island
Bob Engler
516 575-3282

Washington
George Dill
703 527-7722

Norwalk, Conn. **Los Angeles**
Ken Lee
203 853-4922
Jim Gajniak
213 986-6490

Engineers:

This CDC/Cyber computer service offers unique support capabilities.

Now you can solve more of your engineering problems with greater support than ever before. Our problem-solving capability starts with the remote computing power of dual 131K CDC/Cyber systems but doesn't stop there. In addition to raw computer power, you get:

TeleScope™

Our operating system is a super-set of CDC Scope 3.4, recently upgraded to NOS/BE. It incorporates a unique combination of hardware, communications and software programs to provide a powerful batch computing resource with a new level of interactive responsiveness.

People

CallData Systems backs its TeleScope engineering and scientific capabilities with on-staff engineers, not just computer programmers. For example we have both structural and test engineers to help you set up your problems for fast, accurate solutions. If there are several applications programs which can solve your problem, our staff can help you select the one that best suits your needs.

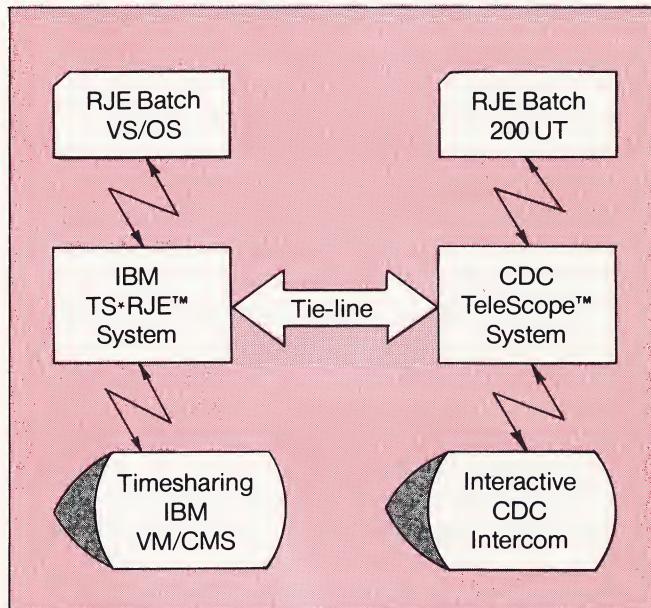
Applications Software

We have simplified complex and versatile engineering software packages, such as NASTRAN, ANSYS, ADPIPE and PLANS. They are up and ready for you to run with unique interactive pre- and post-processing capabilities. Each major application is tied into our extensive graphics library which allows you to visualize both design and result, and to spot and correct errors with minimum delay. Our applications library and the related utilities were designed and implemented by engineers to solve real engineering problems quickly and economically.

Tie-Line

We've tied the ease of use and interactive capabilities of our 5-million byte IBM-370 TS+RJE™ computer network to the precision and power of

The best of IBM/370 and CDC/Cyber.



TeleScope. Effectively, we've put the traditional power of a CDC/Cyber on-line to the IBM user.

Diagrammed above, our Tie-Line link permits you to choose the most cost-effective, responsive approach to each project's needs, while drawing on the software products, applications library and unique hardware capabilities of both IBM and CDC systems with a host of peripherals.

Today, it is probable that our TeleScope service can help you solve your problems more economically than any other CDC/Cyber-based computer service. And all the communications are in place for you to access TeleScope from anywhere in the U.S.

For a further introduction to TeleScope, please call your local CallData sales office or contact Rich Daly at CallData Systems, Inc., 20 Crossways Park North, Woodbury, New York 11797, (516) 575-2951. A Grumman company.

ANSYS is a product of Swanson Analysis Systems, Inc.
ADPIPE is a product of Arthur D. Little, Inc.

CallData™

Personalized services: you grow, we grow.

Waltham, Mass. **New York**
Al Droege Joe Frank
617 890-1200 212 764-1180

Atlanta
Dave Harte
404 346-0501

Boston
Steve Saunders
617 423-6780

Philadelphia
Mike Yankanic
215 545-5600

Long Island
Bob Engler
516 575-3282

Washington
George Dill
703 527-7722

Norwalk, Conn.
Ken Lee
203 853-4922

Los Angeles
Jim Gajniak
213 986-6490

Retailers:

A complete store management system for as little as \$513 a month.

Now you can have a total retail-store management, accounting and control system that puts the power and speed of computers to work for you. And you don't even have to know anything about computers.

It's F*A*C*T*S™ (Fast Access Computerized Transaction System) from CallData Systems. Faster, more comprehensive and lower in cost than equivalent NCR systems, F*A*C*T*S does all your work from a simple, typewriter-like terminal located in your store(s). Anywhere in the U.S. or Canada.

With F*A*C*T*S you analyze sales and inventory information on both unit and classification levels. You prepare merchandise orders ready for mailing with complete accounting backup. You maintain current inventories of merchandise and open orders, prepare account payable summaries and checks to vendors.

You control accounts receivable by producing timely credit authorization reports, exception reports on past-due accounts and 12-month summaries of each account's payment and purchase activity. F*A*C*T*S improves cash flow by preparing customer statements swiftly and accurately.

Every function is flexible to suit your own requirements. For example, finance charges and credit limits can be controlled individually. Lists, letters and mailing labels can be prepared for customers selected by purchase activity or any other criteria. F*A*C*T*S can even prepare payrolls and print checks for all employees together with tax status.

As shown at right, each F*A*C*T*S program guides your people easily through the entire operation. The computer asks leading questions in English, records answers and prepares appropriate forms and reports.

CallData helps you set up F*A*C*T*S and get it running. Customer support is available promptly - in person, by telephone or on your terminal.

For more information talk to our customers or call

F*A*C*T*S in action.

User response to computer questions is in red.

HELLO, THIS IS THE FACTS MONITOR.
WHAT PROGRAM FIRST? ORDER
ORDER 2/28/77 3:55 P.M.
TO CHANGE AN ORDER, TYPE "CHANGE"
NEW ORDERS, TYPE VENDOR'S CODE NAME.
CHANGE OR CODE NAME? BLACKER
PLEASE VERIFY: IS THE VENDOR
STANLEY BLACKER? YES
ORDER NUMBER: 4849
VENDOR'S ORDER NUMBER? 1201
START SHIPPING DATE? AR
COMPLETION DATE? 3/30/77
TERMS: DISCOUNT? 4
TERMS: EXTRA DAYS TO PAY? 2
TERMS: DUE (1=10 EOM,
2=30 DAYS)? 1
STYLE NUMBER? 73
COLOR? BLACK
DESCRIPTION? KNIT SUIT
COST? 90.00
RETAIL? 185.00
CLASS? 15
SIZE RANGE CHEST SIZE
SCALE AVAILABLE: 35 TO 54? 36-44
SIZE RANGE LENGTH SIZE
SCALE AVAILABLE: XSHORT TO
XLONG? SHORT-LONG
I WILL CALL ALL OF THE LENGTH SIZES
FOR EACH CHEST SIZE.
QTY SIZE 36 SHORT? 1
QTY SIZE 36 REG? 1
QTY SIZE 36 LONG? 2
QTY SIZE 37 SHORT? 2
QTY SIZE 37

or write Geoffrey C. Schlagman, CallData Systems, Inc., 20 Crossways Park North, Woodbury, NY 11797, 516-575-5650. A Grumman company.

F*A*C*T*S is a trademark of CallData Systems, Inc.
F*A*C*T*S was developed by Teledata, Inc.

CallDataTM

Personalized services: you grow, we grow.

Waltham, Mass. New York
Al Droege Joe Frank
617 890-1200 212 764-1180

Atlanta
Dave Harte
404 346-0501

Boston
Steve Saunders
617 423-6780

Philadelphia
Mike Yankovich
215 545-5600

Long Island
Bob Engler
516 575-3282

Washington
George Dill
703 527-7722

Norwalk, Conn.
Ken Lee
203 853-4922

Los Angeles
Jim Gajniak
213 986-6490

Market managers:

The simplest, low-cost way to get full demographic, housing and economic data for any trade area.

Now you can analyze the trade area of your choice from a remote computer terminal in your office. And do it more effectively and economically than by traditional manual methods.

This breakthrough is called Tradarea™, CallData's remarkable system for performing complete trade area analyses in the U.S. and Canada.

Thanks to Tradarea, you're no longer confined to existing census boundaries which rarely conform to the specific trade area you want to analyze. Nor do you have to spend tedious hours preparing calculations from published material which, at best, give you only a limited number of characteristics about a very generalized area.

With Tradarea, you define the precise area for which you want information. Any size, any shape. As illustrated, the selected area can be subdivided into zones based on distance.

The simplest operation.

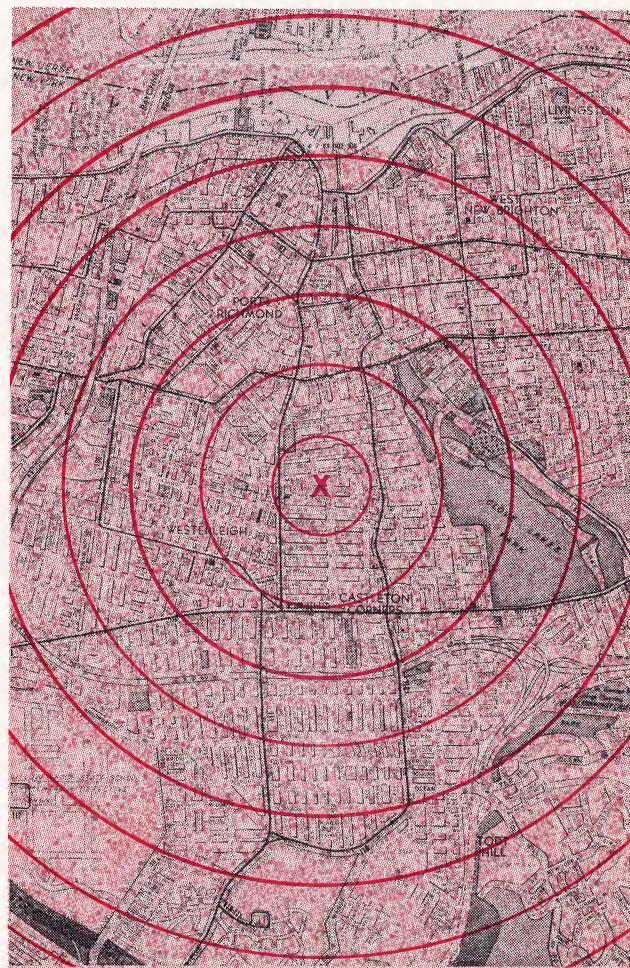
You can access Tradarea in over 70 cities directly from your own terminal via a local telephone call. Or through CallData's nine district offices throughout the U.S. Tradarea commands are in plain English. Any user will become an expert within a few hours of training.

You get information from its data bank by answering a series of simple questions put to you by the computer. This data bank contains more than 100 variables such as sex, age, education, housing type and age, autos owned, family size, income, etc., etc.

What about cost?

Cost is one of Tradarea's biggest advantages. CallData will set you up with Tradarea for an initial charge as low as \$150. From then on, you pay only for what you use on a "per run" basis.

Check our costs against the competition. We're sure you'll find Tradarea offers at least as much data at a cost that is markedly less. Would you believe less than \$20 for a typical single location?



Tradarea is already being used by major banks, oil companies, fast food and grocery chains. You could have Tradarea working for you within days of your decision to try it.

For full information, please contact your local CallData office, below. Or Bruce Backa, CallData Systems, Inc., 20 Crossways Park North, Woodbury, N.Y. 11797. (516) 575-7888. A Grumman company.

CallData™

Personalized services: you grow, we grow.

Waltham, Mass. **New York**
Al Droege Joe Frank
617 890-1200 212 764-1180

Atlanta
Dave Harte
404 346-0501

Boston
Steve Saunders
617 423-6780

Philadelphia
Mike Yankanic
215 545-5600

Long Island
Bob Engler
516 575-3282

Washington
George Dill
703 527-7722

Norwalk, Conn.
Ken Lee
203 853-4922

Los Angeles
Jim Gajniak
213 986-6490

Accountants:

Now you don't have to be a computer expert to have all the advantages of computers.

Today most accountants spend far less time than they should doing the analyzing, reporting and recommending that they are trained—and paid—to do. The rest of the time they scramble to find and piece together books, records and basic data from which they must do their more professional work. Now CallData offers a far better way.

We support accounting and management with two (three if you are in retail operations) computerized systems that require no computer expertise to run. Ordinary accounting language (plain English) puts the full capability to work.

Because these systems run on our 24-hour-a-day IBM remote computing system, there is no investment to make in computer hardware or personnel.

The basic level is a complete, instantly accessible system of books and records of customer, vendor and other significant data. As we install this system, we can customize it to fit the particular needs of the user.

To make sure the system serves all of management's needs on a current basis, we plan an internal network which permits each authorized user access to pertinent records or journals right on his own terminal—right in his own office or nearby space. Inputting the system is equally flexible.

Financial reporting and analysis.

To facilitate the speed, scope and variety of financial reporting and analysis, CallData backs up the basic level accounting system with CallPlan™.

Using the same computerized data generated at the basic accounting level, and supplemented by any other pertinent data, CallPlan permits a user to swiftly format reports in any tabular or graphic form. Consolidations, projections, budgets and estimates are quickly structured and readily updated.

Key benefit of CallPlan is the ability to play "What-if"

Three levels of computer support.

1. Broad base accounting.

- General ledger.
- Accounts receivable.
- Accounts payable.
- Payroll.

2. CallPlan reporting and analysis.

- Profit and loss statements.
- Balance sheets.
- Source and use of funds.
- Proforma statements.
- Cash flow statements.
- Budgeting.
- Capital investment analysis.
- Forecasting.
- Variance analysis.
- Acquisition-merger analysis.
- Consolidation reporting.
- Product planning.
- ROI analysis.

3. Retail operations.

- Purchase orders.
- Statements.
- Merchandise-received.
- Inventory records.
- Tags and labels.
- Sales productivity.
- Sales analysis.
- Mailing labels.
- Letters to accounts.
- Instant record access.

to foresee the end result of many alternatives. Inputting alternate sets of data generates alternative consequences. All in a fully interactive, fully customized way. With assured security, too.

At the retail level CallData offers F·A·C·T·S™, the first computerized system to meet all the needs of retail operations. It provides full daily operating tools, along with correlated financial data.

Which system can help you most?

An accountant working with CallData's systems is likely to find his job far easier and the bottom line far blacker. And that's what it is all about. For more information call or write Walter Winfree, CallData Systems, Inc., 20 Crossways Park North, Woodbury, NY 11797. 516-575-5650. A Grumman company.

CallPlan is a product of MDCR, Inc.
F·A·C·T·S was developed by TeleData, Inc.

CallData™

Personalized services: you grow, we grow.

Waltham, Mass. **New York**
Al Droke Joe Frank
617 890-1200 212 764-1180

Atlanta
Dave Harte
404 346-0501

Boston
Steve Saunders
617 423-6780

Philadelphia
Mike Yankanic
215 545-5600

Long Island
Bob Engler
516 575-3282

Washington
George Dill
703 527-7722

Norwalk, Conn. **Los Angeles**
Ken Lee Jim Gajniak
203 853-4922 213 986-6490

Financial executives:

Now, create computer reports and forecasts without knowing anything about computers.

CallData Systems now offers CallPlan™ - a tremendously versatile financial reporting and analysis system designed specifically for the financial executive. It is immediately available on CallData's nationwide IBM/370 TS*RJE timesharing network.

CallPlan* is by far the easiest system to use, requiring no knowledge of programming. You can operate it personally and communicate with it in English.

Any type of spread sheet analysis can be formatted, then used repeatedly, merely by providing base data. Cash flows, proformas, projections, ratio analyses, variance comparisons are easily constructed, then iterated.

Your valuable time is spent analyzing iterations, not adding and crossfooting. For example, the impact of an interest rate change or a different ROI requirement is immediately seen on the balance sheet because all financial models (cash flow, P & L, etc.) interrelate.

Models can easily be built and used regularly or on a one-time basis. The ability to incorporate "what-if" assumptions unleashes an unlimited number of financial alternatives. Decisions become considerations of alternatives. For example, in the sample usage at right a sales, marketing or financial executive can determine effect on profits as he varies field sales costs.

For our CallPlan brochure, a demonstration, or information on all our financial planning programs, call or write Walter Winfree, CallData Systems, Inc., 20 Crossways Park North, Woodbury, NY 11797, (516) 575-6407. A Grumman company.

Typical CallPlan "what if" example.

In the sample CallPlan model illustrated below, an executive has asked the plain English questions posed at the top of the printout. They are what if:

Gross sales increase by 17.5%.

All sales salaries increased to \$26,000.

All technical salaries increased to \$20,000.

Southern District staff increased to eight sales, four technical, two clerical.

The variance columns show change from original case. In this case, projected changes increase profit by 18.4%.

● P.:WHAT IF (NORTH,WEST) GROSS.SALES=GROSS.SALES*1.175	CALDATA DISTRICTS REPORT						
● P.:WHAT IF (NORTH,WEST) SALARY.SALES=26	1978 PROJECTION						
● P.:WHAT IF (NORTH, WEST) SALARY.TECH=20	\$000 OMITTED						
● P.:WHAT IF PER.SALES,SOUTH=8 ; PER.TECH,SOUTH=4 ; PER.CLER, SOUTH=2	MAY 23, 1978						
● P.:RULES							
● P.:DISPLAY	P & L STATEMENT						
	NORTH	EAST	SOUTH	WEST	U.S. TOTAL	VAR. FROM ORIG.	% VAR. FROM ORIG.
					P & L STATEMENT		
● GROSS SALES	\$4,759	\$11,456	\$1,116	\$6,486	\$23,817	\$3,547	17.5
● RET&ALLOW.	95	229	22	130	476	71	17.5
● NET SALES	4,664	11,227	1,094	6,356	23,341	3,476	17.5
● COST OF GOODS	1,865	4,491	547	3,178	10,081	1,501	17.5
● GROSS MARGIN	2,798	6,736	547	3,178	13,260	1,975	17.5
● ROYALTIES	140	337	27	159	663	99	17.5
● VARIANCES	67	209	(16)	79	339	50	17.5
● GROSS PROFIT	2,591	6,191	536	2,940	12,258	1,826	17.5
	OPER. EXP.						
	MKT	307	610	247	367	1,531	199
	TECH	110	259	88	171	627	86
	ADMIN	233	561	55	318	1,167	174
	INTEREST	30	30	30	30	120	0
	OTHER	5	8	2	6	21	0
	TOTAL	685	1,468	422	892	3,467	459
	PROFIT FROM						
	OPERATIONS	\$1,906	\$4,723	\$114	\$2,048	\$8,791	\$1,366
							18.4

*CallPlan is a trademark of CallData Systems, Inc.

*CallPlan was developed by MDCR, Inc.

CallData™
Personalized services: you grow, we grow.

Waltham, Mass. **New York**
Al Drole
617 890-1200

Atlanta
Joe Frank
212 764-1180

Boston
Dave Harte
404 346-0501

Philadelphia
Steve Saunders
617 423-6780

Long Island
Mike Yankanic
215 545-5600

Washington
Bob Engler
516 575-3282

Norwalk, Conn.
George Dill
703 527-7722

Los Angeles
Ken Lee
203 853-4922

Jim Gajniak
213 986-6490

Attorneys:

Now you can computerize your evidence without being a computer expert.

Rapid, flexible handling of document organization and retrieval can improve your preparation, increase your courtroom success...and help control costs, too.

Today, the fastest way to improve in each of these areas is to put a computer to work...even though you may not know anything about computers. The simplest way to do this is with CallData's LEXIMATIC™, a computerized system for document control.

Working at a computer terminal little bigger than a typewriter, right in your office, you and your staff, assisted by CallData's Legal Services Group, computerize an index for each case. Every document--tens of thousands of them if necessary--is analyzed in terms of your own descriptors--as many as you wish. The unique document number, the descriptors, and the abstract are entered into a CallData timesharing computer. You then file the physical document in accordance with the unique number assigned to each, allowing easy retrieval if the actual document is needed.

Now you have access to all documents by any one or combination of descriptors. For instance, with the right descriptors, you can not only locate all the documents written by Smith to Jones in 1971, but out of the dozens of such letters, you can find the ones discussing trans-shipment of products on the Produce Express trucking line.

Or for witness or trial preparation, it's like creating new index books on demand. Your strategy is not limited by your previous organization of the material because you can change that organization any time you like.

You type a request for data and the system replies instantly, in plain English, printing the requested information on your terminal. Volume reports can be printed overnight by our high-speed printers and delivered to you the next day. If you're unsure of any step, you can simply ask the CallData computer for help and it will explain in detail how to proceed.

A typical LEXIMATIC report.

Criteria: All documents in 1975 dealing with product liability or warranty. Sorted by date, author, addressee and document type.				
SERIAL #	DATE	AUTHOR	ADDRESSEE	SUBJECT ABSTRACT
00023 75/03/01 LETTER		SMITH J	JAMES E F WILLIAMS K	PRODUCT LIABILITY LETTER FROM LEGAL COUNSEL CONCERNING COMPANY'S LIABILITIES FOR INADEQUATE QUALITY CONTROL
00017 75/06/20 MEMO		HOUGH G B	FILE	WARRANTY FILE MEMO DISCUSSING WARRANTY DISCLAIMER IN STANDARD CONTRACT
01634 75/06/20 TELEX		WASS R	MITCHELL L	WARRANTY NOTICE OF CHANGE IN WARRANTY PERIOD FOR FUTURE PRODUCTS
00357 75/08/31 REPORT		THOM K GILBERT P	GLENN A H JONES C	PRODUCT LIABILITY QUALITY CONTROL STANDARDS

The cost of LEXIMATIC is minimal when compared to the cost of manual document management. The small initial cost to get a particular lawsuit on the system varies with the complexity of the case. After that, LEXIMATIC may be transaction-priced. You pay only when you use the system.

LEXIMATIC has been used for litigation evidence management since 1973 and its effectiveness has been demonstrated in a variety of cases.

For information, call your nearest CallData representative at the office listed below. Or contact Mark J. Miller, J.D. at CallData Systems, Inc., 20 Crossways Park North, Woodbury, New York 11797, (516) 575-6158. A Grumman company.

LEXIMATIC is a trademark of CallData Systems, Inc.

CallData™

Personalized services: you grow, we grow.

Waltham, Mass. Al Droege
617 890-1200

New York Joe Frank
212 764-1180

Atlanta Dave Harte
404 346-0501

Boston Steve Saunders
617 423-6780

Philadelphia Mike Yankovich
215 545-5600

Long Island Bob Engler
516 575-3282

Washington George Dill
703 527-7722

Norwalk, Conn. Ken Lee
203 853-4922

Los Angeles Jim Gajniak
213 986-6490

CallDataTM

TeleScopeTM Service

CDC/CYBER

**Engineering and scientific computing
with optional IBM remote job entry**

Powerful Batch Processing with Interactive Responsiveness

In Brief

The speed, power, flexibility and precision of CallData/**Telescope**TM on our 131K CDC Cyber equipment have made it the system of choice for high throughput at low cost. The **TeleScope** system control software, the wide choice of peripherals, the communications, the applications programs, are all effectively integrated to produce a complete, versatile and economical scientific computer service.

TeleScope combines the computing power and precision the scientific and engineering community expects from a large-scale CDC machine with the ease of use and interactive capabilities of a timesharing system.

The Tie-Line facility connects CallData's 3-million byte Amdahl/**TS*RJE** and the 131K CDC Cyber/**TeleScope** Systems. This direct link between large-scale Amdahl and CDC computers permits you to choose the most cost-effective system for each data processing project. Thus you can realize the benefits of dealing with a single service and still have access to both systems' software products, applications library and unique hardware capabilities.

With this unusual combination of resource you obtain more:

- Economy
- Computing
- Flexibility
- Power

Simple commands direct your job to the proper system and control the destination of your output.

TS*RJE/Timesharing users can also direct their jobs through **TS*RJE/Batch** system for execution on the TeleScope system.

Typical Applications

• Engineering

NASTRAN-PLUS, designed primarily for large structural problems, can handle a variety of static, dynamic, transient, heat transfer, buckling, thermal, random Gaussian and non-linear loadings. Peripheral programs provide graphics and simplify input and analysis of results.

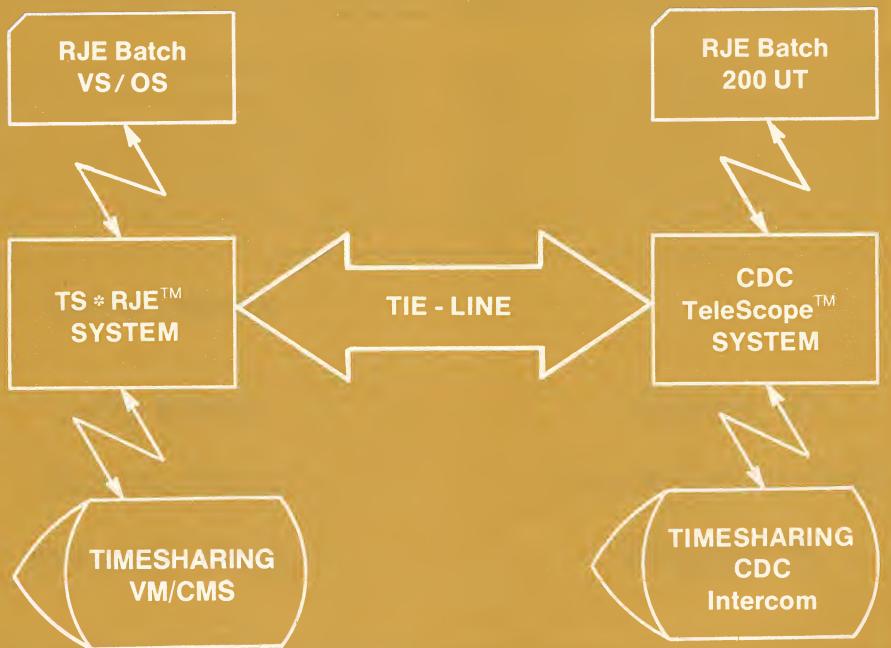
ADPIPE provides complete stress analysis of complex piping systems subject to thermal, static and dynamic loads. Special interactive pre and post processors permit data input and editing, job initiation and selective output via low-speed terminals. *A product of Arthur D. Little, Inc.*

ANSYS is a large-scale finite element program. Its capabilities include structural analyses (static and dynamic; elastic, plastic, creep and swelling; small and large deflections), and heat transfer analyses (steady-state and transient; conduction, convection and radiation). *A product of Swanson Analysis Systems, Inc.*

STARS is a system of programs used to analyze static, vibration and buckling responses of thin shells of revolution. Shell shapes can be ellipsoidal-spherical, ogival-toroidal, modified ellipse, conical-circular plate, cylindrical, discrete ring, elastic support.

TS*RJE and TeleScope are trademarks of CallData Systems, Inc.

THE CHOICE IS YOURS



● Naval Architecture

SCORES 2 is an extension of the original SCORES program which has played a major role in improving the evaluation of ship design. Program output options include: all motions (six degrees of freedom), bending moments, torsions, shears, accelerations, drift forces, tank pressures and mooring line tensions. SCORES 2 is applicable to a wide variety of vehicles and floating offshore structures. *A product of Oceanics, Inc.*

● Information Management

SYSTEM 2000 has hierarchically structured files to minimize search time for any retrieval, and can produce a report on simple command with little format specification. Five levels of security allow differentiated access and control permissions. With archival copies and an audit trail, any previous version of a database can be readily reconstructed. *A product of MRI Systems Corp.*

● Other Applications

Other application disciplines include interactive graphics, mathematical and statistical libraries and general utilities.

In addition, Tie-Line provides access to the CallData **TS*RJE** applications library.

Technical Support

We provide both initial and ongoing support to help you in entering the system and to keep you operating at maximum efficiency. The initial orientation seminar presents **TeleScope** system procedures, CDC and CallData

utilities, the Tie-Line feature, libraries and languages, requested applications usage and accounting procedures.

Casual on-going technical support is, like initial support, free of charge. Our technical representatives have had extensive consulting experience and can solve a wide range of problems. If, however, expertise in a particular area is required, our representative will refer you to a CallData specialist in that area.

Languages and Processors

CallData **Telescope** supports these standard CDC compilers and processors:

- | | |
|--------------------|--------------|
| ● Fortran Extended | ● FTN Debug |
| ● Run 2.3 | ● Sort/Merge |
| ● Cobol | ● Update |
| ● Basic | ● Form |
| ● Compass | ● Pert/Time |
| ● Editor | ● Sympl |

Others may be available upon request. A complete library of utilities is also available.

Versatile Terminal Support

CallData **Telescope** supports high-speed terminals which can emulate the CDC 200 User Terminal and lowspeed terminals compatible to the Teletype model 33/35. Some examples are:

- | | |
|------------------|-------------------|
| ● Hazeline CRT | ● GE Terminet |
| ● DCT 500 | ● DecWriter LA 36 |
| ● Tektronix 4010 | ● TI Silent 700 |
| ● CDC 731 | ● Cope 1200,1600 |
| ● Data 100 | ● Unitech UTI |

In addition, Tie-Line extends **TeleScope** access to include any terminal functionally equivalent to an IBM 1130, 2780, 3780 or 360/20.

You have the choice of these line speeds:

- Directly
- CPS: 10,30,120
 - BPS: 2400,4800, 9600

- Via Tie-Line
- CPS: 10,30,120 (Telenet)
 - BPS: 2400,3600, 4800,9600

Competitive Benchmarking

To prove that we can do a better job for you, we're ready to benchmark your typical jobs at no cost to you. With the results of the benchmark in hand, you can judge for yourself the:

- Savings in time and money
- Quality of our technical support and other related services
- Ease of conversion and flexibility of the system and software products.

We stand by our performance, and we're more than ready to be judged by it.

Detailed Billing

Maximum data processing usage is provided at minimum possible cost. Charges accrue only when the system is used, and only for that portion of the system being used. Moreover, you are furnished with detailed monthly usage reports which, at your request, can be allocated by your project or department designation. The CallData GO*PAC™ accounting program and a proprietary financial reporting system are used to assure concise and accurate cost reporting.

CallData: for personalized computing

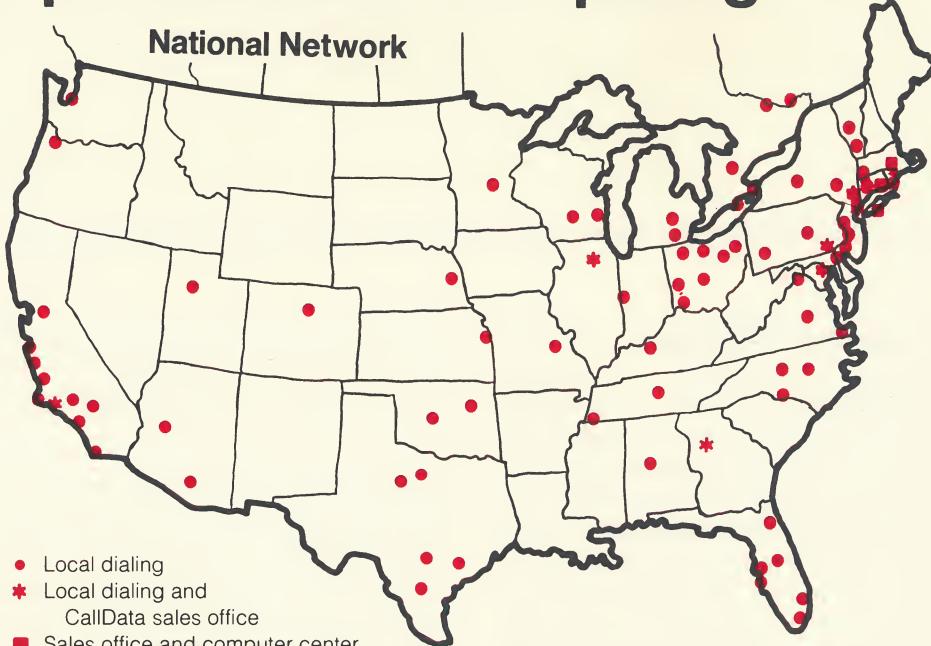
Since its founding in 1970 as a subsidiary of the Grumman Corporation, Grumman Data Systems Corporation (creator of CallData) has grown to be one of the largest computer services and software contractors in the industry. As a result of this success, CallData Systems, Inc. was organized as a Grumman Data Systems subsidiary in July 1975 to increase flexibility in satisfying the general computer services market.

CallData offers one of the largest, most diversified non-government computer facilities in the eastern U.S., including Amdahl, CDC, DEC, Honeywell and IBM systems. With a combined staff of more than 1400 who know the capabilities of the equipment and understand the EDP needs of today's business, engineering, scientific and educational communities, we have continually expanded our capabilities in:

- Remote computing services
- Commercial, engineering and scientific applications
- Educational services
- System analysis, design and programming
- Microfilm services
- Automated publication services

...and allied areas. With this expertise, we have pioneered in hardware and software developments, customized on-line computer systems, enhanced timesharing, and proprietary software products and we are ready to meet the changing demands on data processing from its universe of users.

As the commercial arm of Grumman Data Systems, CallData can call on



Akron	Dayton	Milwaukee	Philadelphia	San Jose
Allentown	Denver	Minneapolis	Phoenix	Seattle
Anaheim	Detroit	Montreal	Pittsburg	Springfield
Ann Arbor	Fort Lauderdale	Nashville	Portland	Stamford
* Atlanta	Fort Worth	* New York	Providence	Syracuse
Austin	Hanover	Newark	Raleigh/Durham	Tampa
Baltimore	Hartford	Newton	Richmond	Toledo
Birmingham	Houston	Norfolk	Rochester	Toronto
Boston	Indianapolis	* Norwalk	Sacramento	Trenton
Bridgeport	Jacksonville	Oklahoma City	Saint Louis	Tucson
Buffalo	Kansas City	Omaha	Saint Petersburg	Tulsa
Charlotte	* Los Angeles	Orlando	Salt Lake City	* Washington
* Chicago	Louisville	Ottawa	San Antonio	Wilmington
Cincinnati	Madison	Oxnard/Ventura	San Bernardino/	Winston-Salem/Greensboro
Cleveland	Manchester	Palo Alto	Riverside	Woodbury, L.I.
Columbus	Memphis	Pasadena	San Diego	Youngstown
Dallas	Miami	Paterson/Passaic	San Francisco	

other Grumman Corporation research capabilities and scientific, engineering, and commercial resources. Chief among these are the Grumman Aerospace Corporation, whose facilities are near our own. Others

include Grumman Ecosystems Corporation, Grumman American Aviation Corporation, Grumman Allied Industries, Inc., Paumanock Leasing Services, Inc., and our immediate parent, Grumman Data Systems Corporation.

Sales Offices

New York City

Philadelphia, Pa.

Washington, D.C.

Long Island

Boston, Mass.

Norwalk, Conn.

Atlanta, Ga.

Los Angeles, Calif.

Chicago, Ill.

CallData™

CallData Systems, Inc., 20 Crossways Park North, Woodbury, New York 11797 (516) 575-5650
A subsidiary of Grumman Data Systems Corporation, Bethpage, NY 11714

The key difference between computer services.

Think for a moment. When you have problems with computer services, are they rooted in hardware, software or people? Generally, it's people.

At CallData™ we're concentrating on people to provide personalized service. But, of course, our shop is in order.

Five systems help personalize computing.

To best solve your applications or needs for system compatibility, we can provide you with local entry into five systems:

TS*RJE™/Timesharing: IBM/VM-CMS on an Amdahl 470.

TS*RJE™/Batch: IBM/VS system on an Amdahl 470.

Easy•Use™ Timesharing: DTSS on dual Honeywell's.

CompUtility™ Timesharing: Triple DECSYSTEM-10's.

TeleScope™ Remote Computing: CDC Cyber, IBM Tie-Line.

No wonder CallData people can make your applications run efficiently and cost effectively.

Five major software libraries.

Backing our five operating systems are over 1000 programs in our software libraries. To them we've added selected software for retail, financial, legal, project management, marketing and engineering applications. Chances are we have the exact program you need or a better one than you have.

State-of-the-art networks.

We are utilizing the latest high-speed, cost-effective networks. By the end of 1978 you will be able to access our five computers locally in over 125 cities coast-to-coast, plus selected overseas locations... by dialing just one number.

Proven data base systems.

We offer a variety of data base software. Some are simple, hands-on, user-oriented systems. Included are options, such as RAMIS II¹, System 2000² and System 1022³, all of which offer some of the most comprehensive, versatile data management opportunities available today. Therefore, we are



most likely to have what you need, running on a cost-effective operating system.

Try your problems on CallData.

We have a full range of solutions with a real difference: people who believe personalized service is the way to grow.

For help please call your local CallData office. Or Kurt Thoss, CallData System, Inc., 20 Crossways Park N., Woodbury, N.Y. 11797. (516) 575-3298. A Grumman company.

(1) Reg. TM of Mathematica Products Group, Inc. (2) Reg. TM of MRI Systems Corp.
(3) Reg. TM of Software House.

CallData™
Personalized services: you grow, we grow.

The key difference between computer services.

Think for a moment. When you have problems with computer services, are they rooted in hardware, software or people? Generally, it's people.

At CallData™ we're concentrating on people to provide personalized service. But, of course, our shop is in order.

Five systems help personalize computing.

To best solve your applications or needs for system compatibility, we can provide you with local entry into five systems:

TS+RJE™/Timesharing: IBM/VM-CMS on an Amdahl 470.

TS+RJE™/Batch: IBM/VS system on an Amdahl 470.

Easy*Use™ Timesharing: DTSS on dual Honeywell's.

CompUtility™ Timesharing: Triple DECSYSTEM-10's.

TeleScope™ Remote Computing: CDC Cyber, IBM Tie-Line.

No wonder CallData people can make your applications run efficiently and cost effectively.

Five major software libraries.

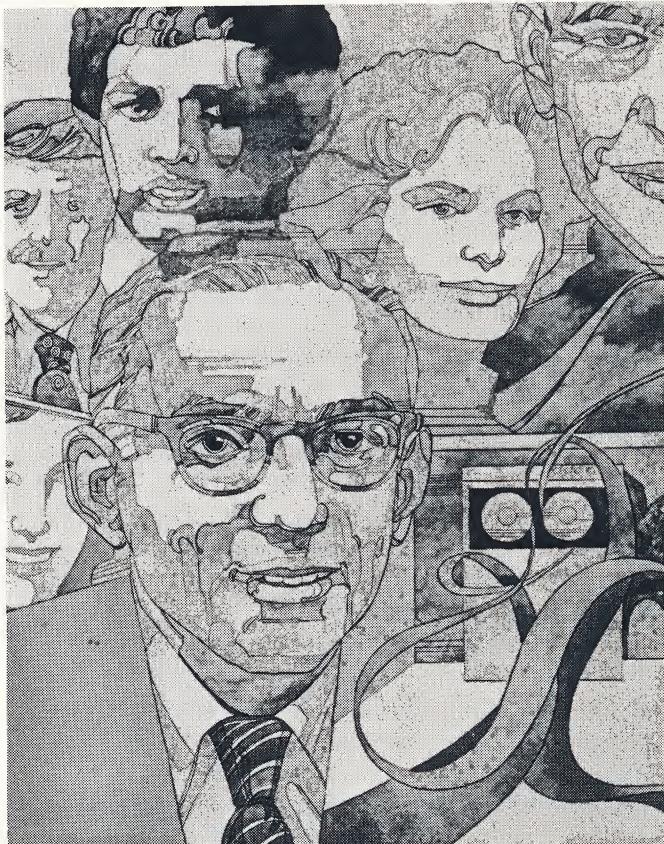
Backing our five operating systems are over 1000 programs in our software libraries. To them we've added selected software for retail, financial, legal, project management, marketing and engineering applications. Chances are we have the exact program you need or a better one than you have.

State-of-the-art networks.

We are utilizing the latest high-speed, cost-effective networks. By the end of 1978 you will be able to access our five computers locally in over 125 cities coast-to-coast, plus selected overseas locations... by dialing just one number.

Proven data base systems.

We offer a variety of data base software. Some are simple, hands-on, user-oriented systems. Included are options, such as RAMIS II¹, System 2000² and System 1022³, all of which offer some of the most comprehensive, versatile data management opportunities available today. Therefore, we are



most likely to have what you need, running on a cost-effective operating system.

Try your problems on CallData.

We have a full range of solutions with a real difference: people who believe personalized service is the way to grow.

For help please call your local CallData office. Or Kurt Thoss, CallData System, Inc., 20 Crossways Park N., Woodbury, N.Y. 11797. (516) 575-3298. A Grumman company.

(1) Reg. TM of Mathematica Products Group, Inc. (2) Reg. TM of MRI Systems Corp.
(3) Reg. TM of Software House.

CallData™
Personalized services: you grow, we grow.

METROCOM INC.

CORPORATE OFFICE:

1500 Southern National Center
200 S. College Street
Charlotte, North Carolina 28202

Tarokh Taefi
President
704/374-1990

Incorporated in Charlotte in 1971, Metrocom's objective as a data processing vendor is to provide any type of computer user, at his own location, the capabilities and power of a large, multi-dimensional computer without incurring:

- 1) The expense of acquiring technical personnel;
- 2) The investment in hardware and associated facilities which become rapidly outdated.

By accessing our tollfree, teleprocessing network, which extends throughout the United States, a customer is able to receive instantaneous feedback of his analysis.

Our combination of services, as described below, enables the remote computer user to capitalize on one of the most efficient and cost-effective arrangements available:

TIME SHARING

This mode of processing allows many people in various locations to use the same computer system simultaneously by simply dialing a phone number at an office terminal and communicating with the computer in a conversational sequence. This medium of processing is economically advantageous since the customer pays only for the resources he uses.

COMPATIBLE TERMINALS—110, 150, 300 or 1200 baud serial asynchronous, ASCII teleprinter terminals—Teletype models 33, 35 and 37, CRT display terminals, plotters, graphic terminals, and IBM 2741.

REMOTE BATCH

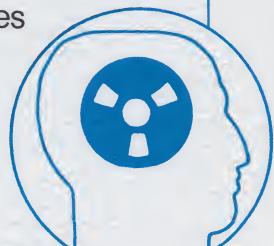
Remote batch is not only ideal for efficiently processing large volumes of data, including large programs which require recurring processing, but it also extends the facilities of batch to any remote user.

COMPATIBLE TERMINALS—Honeywell 716, 516, G115 and series 6000 remote computers, as well as the COPE 1200, DATA 100, IBM 2780 and IBM 360 & 370.

SYSTEMS & SOFTWARE DESIGN

Metrocom maintains a staff of technical programmers and designers to support existing packages and to also develop programs customized to the user's specifications.

Additionally, we offer one of the most comprehensive and extensive libraries of applications programs to users.



METROCOM INC.

APPLICATIONS

BUSINESS

Inventory Management
Report Generation
Accounts Receivable

General Ledger
Retail Sales Analysis
Accounts Payable

Payroll
Job Costing
Production Scheduling

FINANCE

Capital Investment

Lease-Purchase

Cash Flow

MANAGEMENT SCIENCE

Critical Path Methods
Integer Programming

Linear Programming
P.E.R.T.

Transportation
Simulation Modeling

BANKING & INSURANCE

Asset Management
Foreign Exchange
Certificate Of Deposit
Actuarial Analysis

Forecasting
Teller Modeling
Pension Proposals
Deposit Administration

Mortgages & Annuities
General Ledger
Estate Planning
Investments

STATISTICS & MATHEMATICAL

BMD Package
Correlation Analysis

Analysis of Variance
Exponential Smoothing

Chi-Square Analysis
Discriminant Analysis

Polynomial Evaluation
Bessel Functions

Regression—Multiple, Linear, and Stepwise

Curve Fitting
Differential Equations

Fourier Analysis
Root Finders

ENGINEERING

Civil:
Earthwork
Airport Design
Survey

Structural:
Space Frame
Planar Frame
Column Design

Electrical:
AC/DC Networks
Frequency Response
Low-Pass Filters

COMPUTER HARDWARE

Metrocom's Honeywell Level 66 computer system includes a Model 60 processor, Dss 450 disk subsystem, and a Datnet 6632 communications processor. On-line storage is one billion plus characters, and core memory is 256 K words (36 bit words). A communications network of minicomputers and multiplexing equipment supplies local service throughout the U.S.

LANGUAGES & SUBSYSTEMS

BASIC (extended)
ALGOL
APL
ABACUS

FORTRAN IV & V
JOVIAL
DATABASIC
TEXT EDITOR

COBOL
GMAP
CARDIN
IDS

Smarts Controller.

For terminal systems with intelligence.



Western Union Data Services has put "smarts" into its communication terminals through its Smarts™ terminal controller. Smarts-controlled terminals can perform your multiple applications concurrently, making them ideal for moving your intra-company data and mail electronically and accessing various transmission networks.



Smart Operation.

We designed our Smarts terminal controller with multiple microprocessors and floppy disk storage to provide your terminal operators with a powerful operating system for file management, communication control and editing. This makes it possible for your operators to handle concurrently data entry, printing, and interactive or batch communications—with ease. Differentiating Smarts from other intelligent controllers is its ability to handle on-line communications while simultaneously supporting off-line data preparation. Further, with our Smarts controller, you can mix and match any terminals in our product line to tailor a system that meets your requirements.

Features.

- 3 integrated microprocessors
- simultaneous printing, data entry and communications
- 270,000-character disks
- disks removable for storage
- up to 60 operator-named files per disk
- supervisory file protection
- dynamic allocation and deallocation of disk space
- 26-command text editor
- simple English word commands
- integrated diagnostics

Operating System.

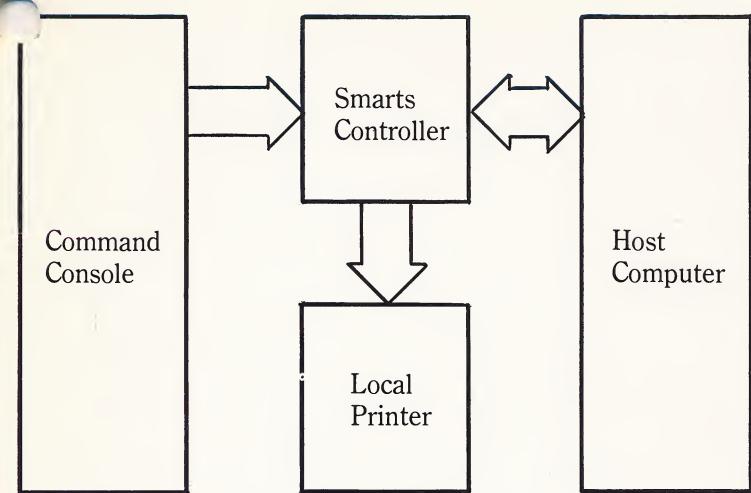
Our powerful firmware enables your terminal operators to use simple English words for:

File Management—With a single word command, operators can create, delete, duplicate, print a file, or key in data. Files can be selectively segregated and linked for transmission and local printing. Besides, pre-stored formats can be called up for prompting operators through a variety of applications.

Editing—Our 26-command text editor provides many word-processing functions. It permits the operator to search, delete or substitute by character, data string, line or entire paragraphs/pages.

Communication Control—Operators can call, identify themselves, assign, send and receive files, change stop and turn codes, condition for auto answer or terminate a call with a single command.

Concurrent Operation.



The Smarts controller substantially increases your operator output. All functions of the Smarts terminal controller can operate simultaneously in both conversational and batch modes. In the batch mode, an operator can enter data via the console keyboard, while a printer prints locally; concurrently, the controller itself may be on-line with a host computer at 120 characters per second (cps) sending or receiving information. This means that your operators don't sit and wait when their terminals are polled.

In the conversational mode, the console can function on-line with a host computer transmitting or receiving data, while the local printer prints messages or data received earlier.

System Flexibility.

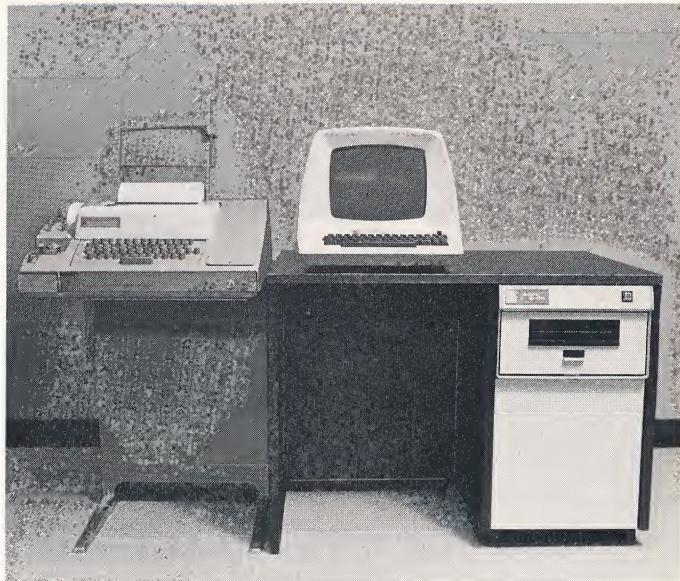
The Smarts terminal controller works with the entire Western Union Data Services product line, both present and future. You have the freedom to design work stations in a variety of configurations to handle the special work loads and terminal requirements of different sites. Each station may have a maximum of one command console and one local printer with up to two 120 cps modem ports. The modular design of Smarts-controlled terminal systems permits planned upward growth for future applications.

Diagnostics.

Self-testing of the Smarts controller's operational functions is automatically initiated when power is turned on or when power interruptions last for 8 milliseconds or more. System status can be determined by indicator lights available to the field service engineer; this significantly aids in restoring the terminal to operation.

In addition, our Termicare® system, a centralized customer support service, can be called toll-free for immediate over-the-phone diagnostics and assistance when a terminal problem arises. Termicare analysts will either clear the problem instantly or dispatch a service engineer from our nationwide organization of local service centers.

Typical Configurations.



Smarts Terminal Controller Specifications.

Cabinet Configurations:



Stand-alone:
24D x 16W x 27H



Desk-top:
24D x 36W x 27H

Data Transmission:

Code:	USASCII
Interface:	Integrated 202 modem, RS232C
Speed:	120 CPS - 1200 Baud
Type:	Serial Asynchronous

Environmental:

	Controller	Disk Media
Temperature:	+32°F - 122°F Operating -40°F - 162°F Storage	50°F - 80° F Operating 50°F - 125° F Storage
Humidity:	10 - 95% (without condensation)	8 - 80% (without condensation)
Altitude:	0 - 12,000 Ft. Operating 0 - 50,000 Ft. Storage	0 - 12,000 Ft. Operating 0 - 50,000 Ft. Storage

Electrical:

Voltage: 95 to 135 VAC, single phase, 60 Hz ± .75 Hz

For Further Information:

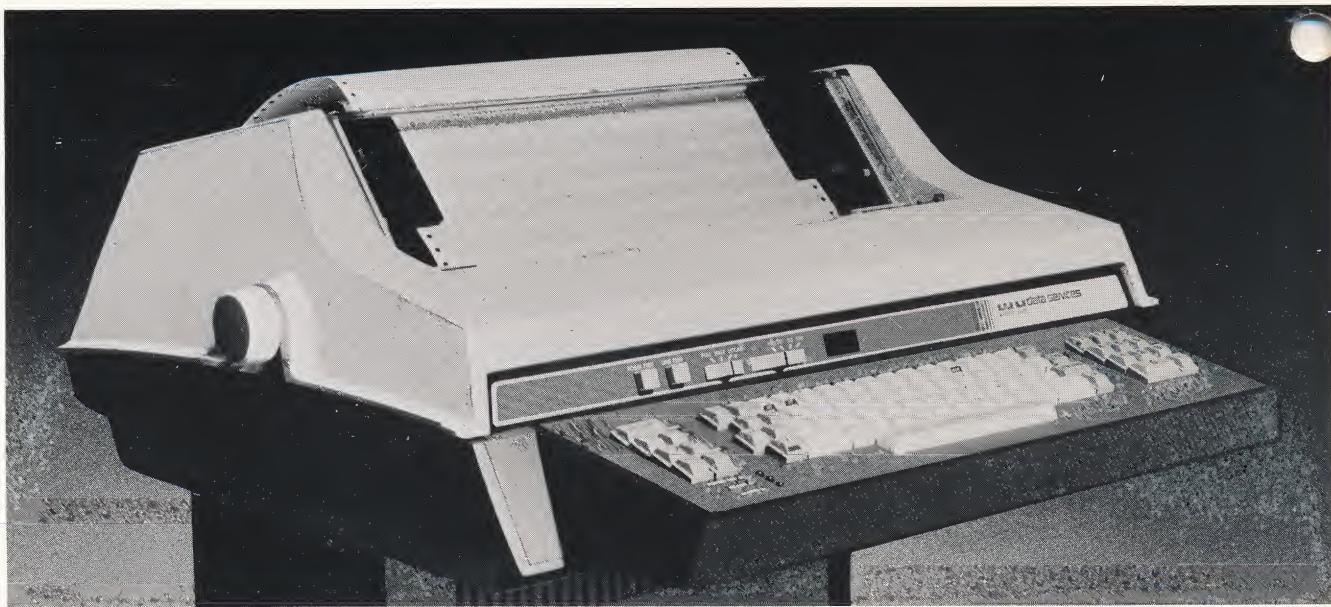
Call or write: General Sales Manager, Western Union Data Services
70 McKee Drive, Mahwah, New Jersey 07430
Phone: Toll-free 800-631-7050; in NJ, 201-529-1170; TWX 710-988-5468

EDT 1232 series.



120 cps throughput. High print quality.

The EDT 1232 KSR.



Our Electronic Data Terminal (EDT) 1232 Keyboard Send-Receive (KSR) is ideal for on-line interaction between the terminal operator and a computer. Lengthy printouts are a natural for this terminal at 120 cps.

1232 RO.

The 1232 Receive-Only (RO) printer easily can handle lengthy print volumes with the ease of a line printer. The 1232 RO front loading provides a non-restrictive pathway for single or multiple part continuous forms.



High print quality.

Our EDT 1232 prints fully formed upper and lower case ASCII characters through the use of a belt with preformed font. You get high-print quality, time after time, even on multipart forms; an original and five copies is normal.

Heavy-duty print mechanism.

The EDT 1232 was designed to operate on a continuous 12-hour-per-day basis to meet the most rigorous data communication workload. Its reliable solid-state keyboard has been made to take heavy-duty use.

120 cps throughput.

Our new teleprinter has a 1,024-character buffer which provides an effective throughput of 120 characters per second (cps). The buffering capability virtually eliminates the need for carriage return or line feed "fill" characters.

132 print positions.

The wide carriage of the EDT 1232 with its 132 print positions per line makes it ideal for your computer-generated reports. Standard computer-width printout paper can be used.

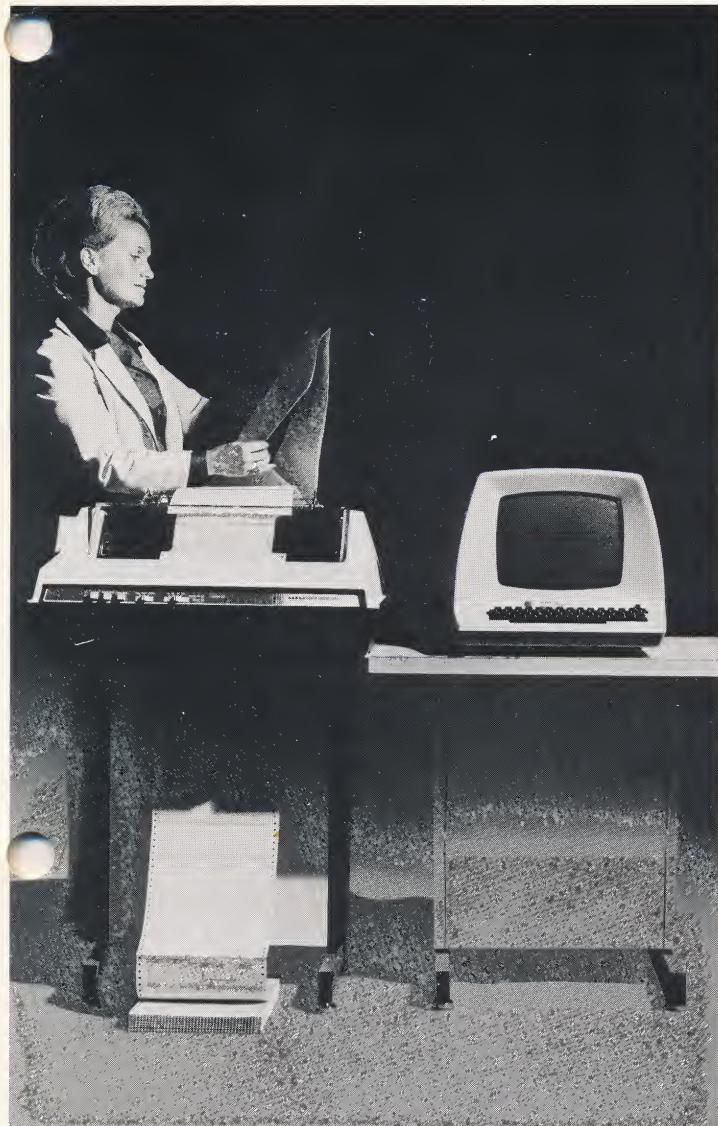
Versatile forms handling.

Paper can be loaded from either the front or rear of the 1232. Front loading places less stress on forms during lengthy printouts. Sturdy adjustable 6-pin form feed tractors handle any width paper from 3" to 14 $\frac{7}{8}$ ".

Increased ribbon life.

Operators appreciate our continuous ribbon-loop cartridge which is easy to install and easy to replace. A separate re-inking unit that re-inks the ribbon as it moves through the cartridge extends ribbon life through 100 million characters and provides clear crisp print for the life of a ribbon.

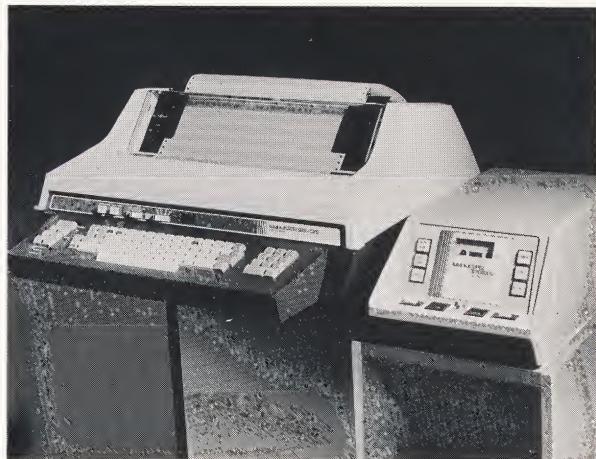
1232 RO with Video 100.



1232 with Smarts.



Associated with our Smarts™ terminal controller, our EDT 1232 KSR is part of a powerful operating system offering extensive editing capabilities, simplified terminal control and a complete file management system using floppy disk storage of over 270,000 characters.



A bidirectional extension port in the Video 100 permits interfacing between the 1232 RO and the V100. The Video 100 keyboard and screen can be used to interact with computer and selectively request high-volume printed reports as needed. This configuration allows both the 1232 RO and the V100 to print and display during transmission or while receiving data.

Standard features:

- Form feed vertical tabulation mechanism
- Horizontal tabulation under computer and local control
- EIA RS232 interface
- Form feed/vertical tabulation rate—8 inches per second
- Vertical lines per inch—6
- Horizontal character spacing—10 per inch
- Keyboard generation—128 ASCII characters
- Complete 95-character ASCII printing graphics
- Switch selectable speeds—10-, 20-, 30-, and 120-cps
- Integrated numeric key pad and control key cluster

1232 MSR.

Equipped with our magnetic tape cassette buffer, the EDT 1232 Magnetic Send-Receive (MSR) can stand in for a computer and either broadcast reports to a terminal system or retrieve data from remote terminals. It can also be used for off-line data preparation and storage, with the terminal being polled later by a remote computer.

Many options.

Western Union Data Services provides over 50 options which add flexibility in tailoring a standard 1232 configuration to meet your individual requirements. Parity error detection, current loop interface, 20 character answerback and 202 modem line control are some of these options.

Specifications.

DATA TRANSMISSION

Code: USASCII 1968
Interface: EIA Standard RS 232C
Speed: 110, 200, 300, 1200 Baud
Type: Serial Asynchronous

PRINTING

Type: Impact; Belt with preformed font
Spacing: 10 characters per inch Horizontal; 6 lines per inch Vertical
Paper sprocket feed: (Tractor) From 3" to 14.87" wide paper
Character set: 94 Printable graphics of USASCII plus space including upper and lower case
Ribbon: Continuous ribbon-loop cartridge with re-inking system
Speed: 10, 20, 30, 120 cps

OPERATOR CONTROLS

Indicators:	Switches:
Motor On	Power—ON/OFF
Interrupt	Motor Control
Power On	Local
Ready	Interrupt
Alarm	All Caps
	Here Is (KSR only)
	Form Feed
	Line Feed
	Auto Line Feed
	Full, Half (duplex), local
	Rate—10, 20, 30, 120

ENVIRONMENTAL

Temperature: +32° F to +110° F Operating
-40° F to +160° F Storage
Humidity: 5% to 95% Operating and Non-Operating (Non-Condensing)
Altitude: 0-12,000 Feet Operating
0-50,000 Feet Storage

ELECTRICAL

Operating voltage: 117 VAC ±10%, 60 Hz ±5%
Power: 10 AMP Start Up
3 AMP Printing
1 AMP Standby

PHYSICAL

KSR 34.52"(L) x 26.14"(W) x 37.8"(H); 166 Lbs.
RO 29.32"(L) x 26.14"(W) x 37.8"(H); 159 Lbs.

For further information:

Call or Write: General Sales Manager, Western Union Data Services
70 McKee Drive, Mahwah, New Jersey 07430

Toll-free 800-631-7050; in NJ, 201-529-1170;
TWX 710-988-5468

Data Communication Terminals.



WU
western union

Western Union Data Services.

The Company.

Western Union Data Services is a subsidiary of the Western Union Corporation, which offers a broad range of advanced telecommunication services such as terrestrial and satellite transmission, exchange, public message and computerized information services.

Designing, marketing and maintaining data communication terminals for all types of transmission networks is the business of Western Union Data Services.

Product line.

Our product line ranges from stand-alone teleprinters or CRTs to a multi-microprocessor-based terminal controller, with floppy disk storage, that supports all of our terminals either in single- or multiple-terminal work stations. Protocols include Teletype® ASCII and Binary Synchronous.

Within this broad range are teleprinters with speeds of 10 to 120 characters per second (cps), and buffered and unbuffered CRTs with speeds up to 19,200 cps.

Each terminal in the product line is available in many configurations to meet specific data-handling requirements. Magnetic tape cassette buffers, paper tape buffers, acoustic couplers, TWX® adapters and alternate use switches have been added to these terminals. In addition, a variety of communication modes is offered with a variety of modems.

With our controllers, terminal speeds and protocols can be mixed on the same system to create configurations to meet specific needs. Most important, they add "smarts" to terminal configurations, providing a powerful operating system with concurrency, extensive editing and message management capabilities.

Support services.

We provide support throughout the implementation cycle of your terminal system:

Planning Phase—Our application engineers help you plan a proper match between equipment and application, people and systems.

Definition Phase—Our systems engineers work with your computer and communication designers to match terminal hardware to software requirements.

Hardware Phase—Terminals are engineered to meet the computer timing, software, line arrangement and control function requirements.

Cut-over Phase—Our support groups supervise pilot terminal installation, respond to need for modifications, and finally coordinate the implementation of your terminal system.

Most important, we keep your terminals working through our nationwide organization of local service centers and our Termicare® system.

Our terminals can be purchased or leased under a variety of convenient plans.



Termicare.

When you lease terminals from Western Union Data Services, you get our unique, centralized customer support service—our Termicare system—whether you lease one or many terminals from us. For those who are responsible for a terminal system, it gives management control over the system.

Control through surveillance.

Our Termicare Center operates as a single point of control. Here our highly skilled service personnel monitor all terminal troubles until they have been cleared.

Because trouble calls are funneled to our Termicare Center, we are alert to possible system problems. For example, a rash of calls from operators about similar difficulties could signal a system, not a terminal, problem. The cause could be a computer programming change or a change in computer interfacing.

We analyze information we receive through our Termicare eyes and ears, and we make this information available to you in a variety of management reports.

When you want to know your system's current status, you simply call our Termicare Center. You will know quickly how many terminals are up or down. When required, we'll provide expected arrival times for our service engineers or the status of a needed part.

When you want an overview of your terminal system's total performance, our Termicare staff will provide a historical report. It summarizes your terminal troubles—their location and nature, corrective action taken, and when they were reported and cleared.



Control through response.

At the first sign of trouble, terminal operators simply call our Termicare Center toll free. In seconds, experienced terminal analysts access the terminal's description and service history from the Termicare computer. Then we check operator procedures and, if necessary, the terminal itself through terminal-to-terminal testing.

If a terminal needs repair, we'll identify the problem, and quickly dispatch a local service engineer from our nationwide field force. With this information in hand, the service engineer knows what to look for before starting out.

At the terminal site, our service engineers have at their disposal a computerized diagnostic system for field testing the problem terminal. They simply call up a specialized computer at the Termicare Center and order up diagnostic routines and terminal tests for computer execution on the terminal. When the terminal is restored, all new trouble data is entered into the Termicare data base for future reference.

Surveillance. Information. Response. It adds up to control. Your control of your terminal system.

Terminal Systems.

Smarts.

At the top of the product line is our multi-microprocessor-based Smarts™ terminal controller, a stand-alone unit with disk storage. The controller can be combined with any terminal in our product line to configure a single- or a multi-terminal station with the ability to handle a combination of protocols, including Teletype ASCII, TWX, Binary Synchronous or private wire.

The controller provides your terminal operators with a powerful operating system for editing, message management and storage, as well as terminal control that speeds message handling and data entry.

Concurrency—In a Smarts-controlled system with a printer and CRT, the printer can print out reports while transmissions are being sent and received from two different networks—all while the operator enters information on a CRT, uninterrupted.

Editing—Using English-word commands, operators can easily search within a message's contents and edit text—adding, deleting or changing information at will. Sentences and paragraphs can be moved around to any point in the text.

Disk Storage—The controller can drive multiple disk storage units. A single diskette stores over 270,000 characters. The controller's file directory displays all messages on a diskette. Operators can randomly access any message.

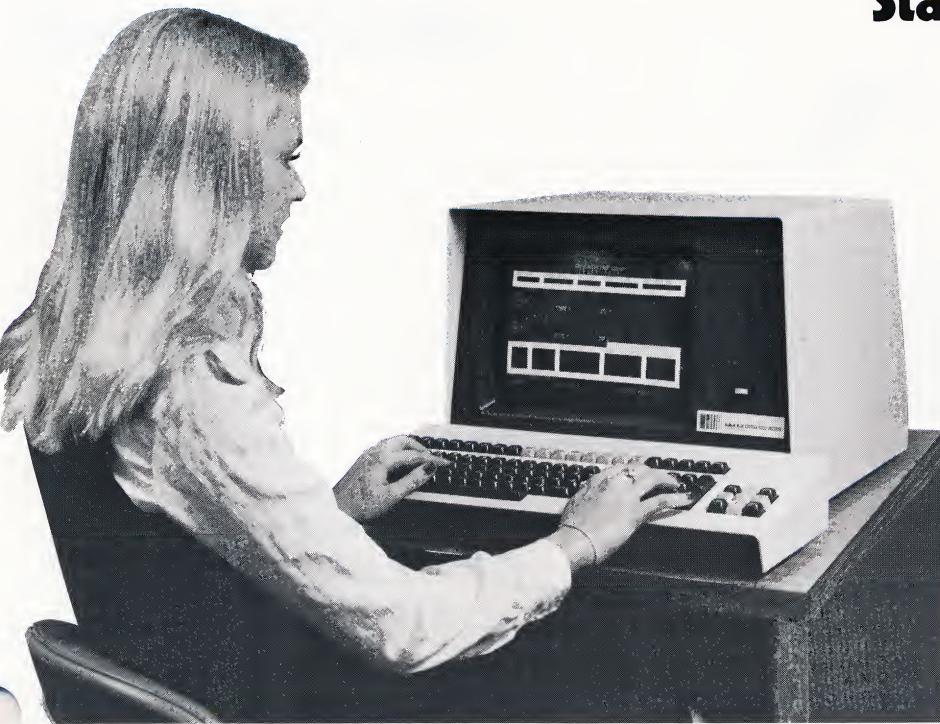
Formats—Predetermined formats of business forms can be stored on the disk unit and called up to step the operator through data entry. Likewise, standard headers and messages as well as formats for all Western Union's InfoMaster® services can be stored to facilitate operator performance.

Message Handling—Messages can be segregated and linked for multiple transmissions or local printing. Messages can be switched by command from one of the controller's communications ports to another, making it easy to switch from one network to another. Messages prepared on one terminal can be adjusted to the carriage width of the receiving terminal.

Multiple Copies—Operators can create multiple electronic-file copies of any message for multiple filings, transmissions or printouts with just an instruction, eliminating the need for retyping.



Display Terminals.



Standard features.

- 9x9 dot character matrix display
- Character-by-character or block transmission
- 80 characters per line x 25 line screen display
- 128 ASCII character keyboard
- Displays 95 ASCII plus 32 forms drawing characters.
- Reverse video, underline, half intensity, blinking fields
- Protected, numeric-only, and non-display fields
- 8 preprogrammed function keys
- Numeric-key and cursor-control pads
- Switch-selectable data rates up to 19,200 bps
- Tabbing and back tabbing
- Erases page/field; inserts and deletes character/line
- Transmits character, page, field, selected fields
- Carriage return/line feed or selectable new line

Video 200.

Designed around an advanced microprocessor, the Video 200 is a buffered, fully featured display terminal. Its highly flexible control functions enable systems designers to tailor the Video 200 to specific system and computer requirements and for multiple applications. The Video 200 enables your terminal operators to handle data entry and editing with ease.

Complete formats consisting of 16 different types of display can be flashed onto the Video 200's screen by the computer to aid operators in entering data accurately. The terminal has a 32-character line-drawing set, which enables the computer to transmit a format of a business form complete with lines, protected fields, tabs and combinations of display features such as reverse video, half intensity, underlining and blinking.

The Video 200's editing capability enables operators to see changes taking place right on the screen. All of the CRT's functions can be controlled from a remote computer as well as from the keyboard.

Optional features.

- Up to two additional pages of memory
- Serial buffered and unbuffered printer interfaces
- Polling and selection
- Hazeltine 2000 emulation
- Time-sharing

Video 100.

Simple to operate as well as economical and compact, the Video 100 has the following features:



- Full 24-line display with 80 characters per line; compact
- 5x7 dot matrix with adjustable contrast switch
- 12-inch diagonal screen; 64-character display set
- Selectable asynchronous data rates to 19,200 baud
- Character display overwrite capability
- Addressable cursor; bottom-line data entry
- Teletype compatible, 1968 ASCII

Teleprinters.



EDT 1232.

The EDT 1232 series offers high print quality, heavy-duty use, 120 characters-per-second throughput, 132 print positions and both front and rear loading of up to 6-ply paper. Standard features include:

- Form feed, vertical tabulation mechanism
- Horizontal tabulation under computer and local control
- Fully formed character, impact printing
- 128 ASCII characters with 95 printing graphics
- Closed loop buffer that prevents data overflow
- Adjustable tractor-feed mechanism; 3 to 15" paper
- Switch selectable speeds—10-, 20-, 30- and 120-cps
- Integrated numeric key pad and control-key cluster

Available as a keyboard send/receive, or as a receive-only teleprinter, the EDT 1232 series comes with more than 100 options.



EDT 300/1200.

A versatile line of communication terminals, these quiet teleprinters transmit and receive at 10-, 15-, and 30-cps for the EDT 300 and 10-, 30- and 120-cps for the EDT 1200, switch selectable.

Standard features include:

- 128 ASCII characters with 95 printable graphics
- 118 print positions for EDT 300; 120 for EDT 1200
- Production of up to six copies plus original

Electronically interlocked, keys cannot generate more than one code at a time. An audible beep is sounded each time a key is depressed to indicate to an operator an action has occurred.

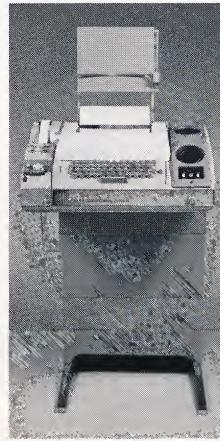
The EDT 300 and 1200 are available in a variety of configurations and with more than 100 options.



EDT 33.

The EDT 33 has a four-row keyboard that generates 63 ASCII printing graphics, plus the space character, in upper case and all control characters. It has a 72-character print line, with an 86-character line available. The EDT 33 produces an original and two copies on conventional paper.

The EDT 33 is available in keyboard send-receive, automatic send-receive and with our magnetic tape cassette buffer. Many options are offered.



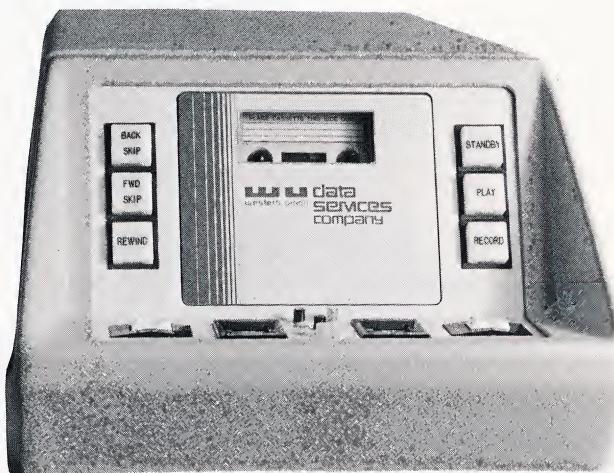
Peripherals.

Cassette Buffer.

Our magnetic tape cassette buffer is both a data-storage device and a communications controller. Acting as the intermediate between a system's printers or CRTs and the computer, it serves as a terminal-system standardizer. This way different computer protocols are not required for different speeds of terminals within a system.

All our terminals can operate with our cassette buffer. For low speed terminals, our buffer acts as a speed converter—up to 120 cps. For both our low- and high-speed printers, the buffer operates as a storage device for batch transmission. Storage capacity is in excess of 50,000 characters.

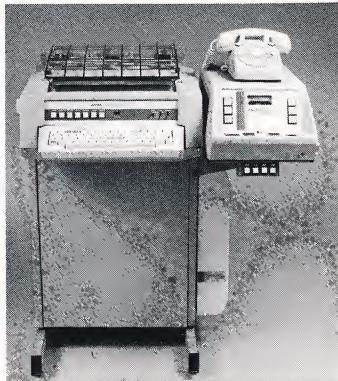
The cassette buffer writes, reads, rewinds and performs character editing under remote computer or local control. It has backspacing as well as data-search capabilities for editing.



Plus TWX.

If your company communicates on both the Bell System's public telephone network and Western Union's TWX network with two separate terminals, you can communicate via both systems with a single terminal—using one of our Plus TWX™ configurations.

We offer Plus TWX on a variety of our teleprinters including EDT 33s and 300s. Plus TWX does everything ordinary TWX terminals do as well as communicate over the telephone network at 10, 15 or 30 cps.



Options.

We have engineered hundreds of terminal options, special customer arrangements and accessory terminal products to "customize" our terminals to your requirements. Some of these are:

- Various form feed/vertical tab controls
- Various paper-handling platens for friction and pin-feed paper
- Acoustic couplers and integrated modems for 103, 202 and 212 compatible operation
- Copy holders; terminal accessory cabinet; and form accumulating, telephone and modem shelves
- Paper tape winder/unwinder
- Pedestals for CRTs; mobile carts
- Interfaces to minicomputers, card readers, plotters and other products
- Variety of answerback, keyboard and printing arrangements
- Wide selection of form, line, mode, format, motor, punch and reader controls

Supplies.

We are a national supplier of paper rolls, paper tape, fanfold forms, ribbons, magnetic tape cassettes and diskettes for use with terminals in our product line.

We also offer form-feed/vertical tab accessories for our EDT 300, 1200 and 1232 teleprinters, as well as a cassette eraser and carrying cases for CRTs.

Paper rolls are carbonless and are available with up to three plies. Fanfold paper is available in $8\frac{1}{2}$ ", $12\frac{27}{32}$ " and $14\frac{1}{8}$ " wide, 11" long sheets for terminals with a pin-feed platen.

Quantity discounts are available. Orders are shipped F.O.B. Mahwah, New Jersey. Call toll free: 800-631-7064; in New Jersey, 201-529-1170.



For further information

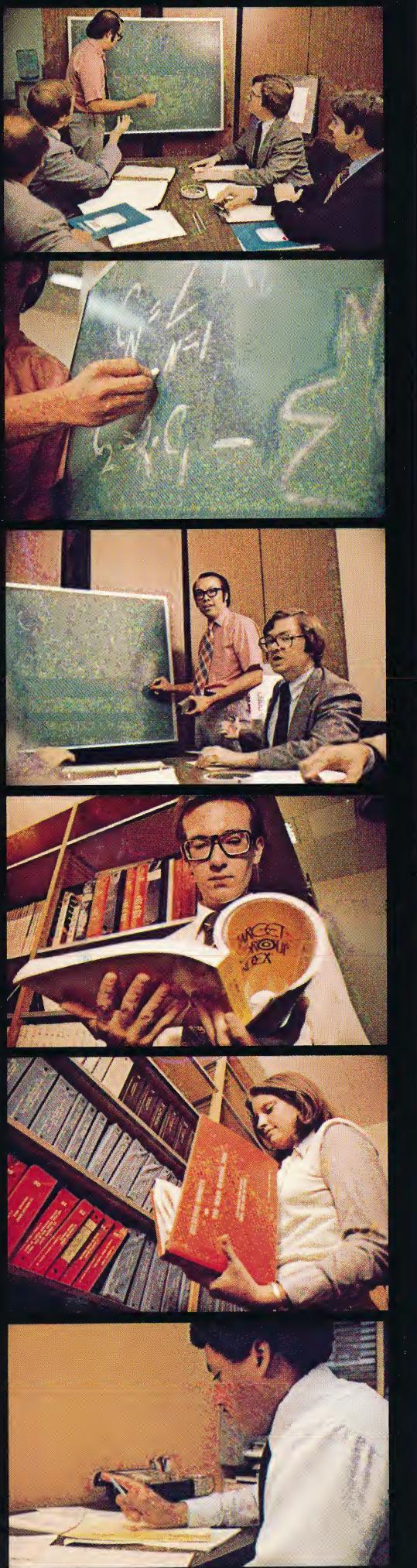
Call or write: Western Union Data Services Company
70 McKee Drive,
Mahwah, New Jersey 07430
Phone: Toll-free 800-631-7050;
in N.J.—201-529-1170
TWX: 710-988-5468

data services
western union

The Custom-Designed World of



In a world of packaged computer systems, one company specializes in custom designs. A good reason why IMS is the systems company for all 3 networks. For 17 of the top 25 advertising agencies. For 18 of the top 25 magazines. And for more national and local media, agencies and advertisers than any other systems company. IMS custom systems are not only less costly...



...than mass-production models, they are more reliable, accurate and flexible.

IMS superiority begins where anything good begins: with superior people, standards, research and products.

IMS people work with the largest in-house library of data bases in marketing and media. And we are constantly creating new data bases. Panel, product movement, media and questionnaire data all become part of our expanding information bank.

**Some of the data bases
IMS works with include:**

Arbitron TV	NPA
Arbitron Radio	Proprietary Market Research Studies
ARMS-II	Proprietary Media Research Studies
Audits and Surveys	Palshaw Measurement-QMR
AXIOM-TGI	Professional Market Research (PMR)
BAR Network TV	J. D. Powers
BAR Spot TV	Purchase Influence
Belden Associates	ORC Youth
Brand Tracking Studies	POLK
Canadian Print	Sales Management
Measurement Bureau	SAMI
Census	W. R. Simmons
Client Sales Data	SRDS
Consumer Panel Data	Starch Elite
MRCA Textile Panel	TMI
Nielsen Retail Index	
Nielsen Station Index (NSI)	
Nielsen Television Index (NTI)	

Our Senior Staff are specialists in every phase of systems technology:

Marketing and Media Research
Operations Research and Statistics
Online Data Base Systems Design
Marketing and Customer Service

Our command of the technology and economics of marketing and media systems gives us more capacity and expertise than companies which rely on generic systems and outside consultants.

IMS programmers — the largest group in our industry — are trained and supervised by our Senior Staff to create inexpensive systems that meet client needs. No matter how large or small, how sophisticated or simple.

Because we design our own systems for our own clients, our entire staff knows every IMS product. From the ground up. Over 30 IMS experts assure fast, knowledgeable answers about every system. For every client. And they can make revisions quickly and easily.

**These are some of the reasons why
IMS is the No. 1 systems company.**

IMS is the largest processor of Simmons and TGI.

Only IMS offers custom-designed, online SAMI and Nielsen Food & Drug Systems.

Only IMS has succeeded in integrating such disparate data bases as BAR and ARB. TGI and ARB. Purchase Influence and Simmons.

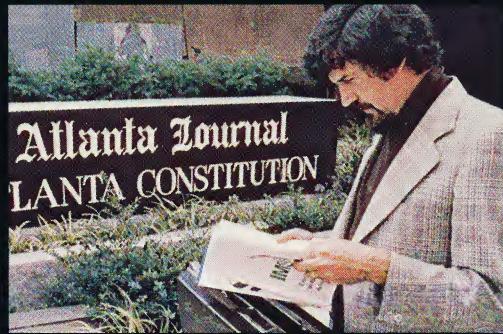
Perhaps most important for our clients — whatever their size or needs — our custom-design approach has enabled us to design a new generation of media and marketing systems. Systems which are more powerful, easier to use and less costly than the best "generic" systems available.

Thus, the benefits of IMS custom-design technology and economy provide media and marketing planning answers for both national and local-market clients alike. Agencies. Media. Advertisers. No matter how big. Or small.

And IMS charges only for answers. There is no fee. No minimum. No contract (unless the client wants one). All you buy is what you want: Answers. Not ordinary answers. IMS answers.

Let us show you how you can put IMS to work for you.

IMS





**19 West 44th Street
New York, New York 10036
212-869-8810**

**37 Cluny Drive 3rd Floor
Toronto, Canada M4W 2P9
416-961-2840**

**819 South Bristol Lane
Arlington Heights, Illinois 60005
312-631-3722**

**Los Angeles World Trade Center
350 South Figueroa Suite 257J
Los Angeles, California 90071
213-624-1261**

**145 Old College Way
Atlanta, Georgia 30328
404-393-0080**

INSCO: Profile



INSCO is a business systems and computer services company. While we are a relatively new entity in a still young industry, we are an experienced organization with well-established roots.

INSCO was established in New York in 1968, and is an affiliate of The Continental Corporation—the tenth largest diversified financial company in the United States. The original INSCO people were previously officers and employees of The Continental Insurance Companies. In that capacity, they were responsible for systems research and development, computer programming, systems analysis, data processing, and teleprocessing functions.

The original staff has since been augmented by the addition of a substantial number of professionals with diverse industry and technical experience. Today, there are over one thousand INSCO people in data centers across the United States and Canada.

Mission

Stated in a word, INSCO's mission is "Productivity." We are specialists in putting the power of modern data processing to work on the kinds of problems that are costing you time and money—today.

However, productivity requires more than the application of raw computer power. It requires direction of that power by intelligent, dedicated people—people with applications experience, people with programming and systems analysis discipline, people with the know-how to make computers operate efficiently.

INSCO has the data processing power and the people.

On the following pages we outline some of our insurance, business and educational systems and services. These are necessarily partial lists. Our people are always striving to develop new applications, new systems, new services.



Insurance Services

INSCO is widely acknowledged as the leader in automated insurance systems and services.

We've helped many leading insurance companies slash policywriting costs, expand into new businesses, and penetrate new markets.

Our approach is to design systems which are as complete and flexible as possible. Then, if necessary, we can modify them to meet an individual company's needs.

Below is a representative list of some of our insurance systems and services.

Automated Insurance Systems/Services

Automobile Policywriting

Homeowners Policywriting

Fire Dwelling Policywriting

Mass Merchandising (including quotation and payroll deduction billing)

Worker's Compensation

Direct Billing

Agency Billing-Accounting

Premium Reporting

Claims Accounting

Premium Taxes

Deferred and Advanced

Annual Statement

Managing General Agents Service

All these systems/services can operate on a "stand alone" basis or as a totally integrated system.

Business Services

INSCO provides a wide array of systems and services to assist businessmen—from payroll processing to manufacturing control systems, from portfolio analysis services to scientific and engineering programs. Here are some of our business systems and services.

Administrative Systems/Services

*Agent's Accounting/General Ledger Service
Budget and Expense
General Report and Statement
Payroll and Personnel*

Business and Financial Services

*Accounts Payable
Accounts Receivable
Payroll Services*

Remote Computing Services

*Interactive Timesharing
Remote Batch Processing
Interactive Symbolic Debugging for Basic COBOL and FORTRAN
Advanced Statistical Analysis
Simulation
Project Management and Control
Interactive Business Analysis
Data Base Management Systems
Support of all Programming Languages and Access Methods*

Manufacturing Management Services

A complete automated manufacturing service providing remote job entry and output, controlling such critical areas as:

*Material Requirements Planning
Capacity Requirements Planning
Stock Status Reporting
Order Status Reporting
Product—Job Costing
Bill of Materials Reporting
Master Production Scheduling*

A modular concept allows users to automate one or more of the above areas initially and then grow into a fully integrated service.

Investment Portfolio Analysis Service

INSCO offers insurance companies, banks and other financial organizations a better way to price their portfolio and prepare the investment reports needed for making effective financial decisions. Included in this service are Valuation and Accounting Reports, along with Schedule D of the Annual Statement. In addition, other reports are available to meet specific needs.

Management Services

Management consulting services are offered in such areas as improved work flow patterns, work simplification programs, filing systems, work measurement, forms design and control procedures, and graphic arts copy and preparation services.

Education



Services
acturing
entry and
l areas as:
ng
ing

rs to auto-
areas
lly inte-

s Service
anies, banks
ns a better
e prepare the
making
cluded in
Accounting
D of the
other re-
specific needs.

ces are
ved work
on pro-
asurement,
cedures,
paration

Educational Services

The INSCO Education Center is a rapidly growing institution specializing in teaching computer programming and systems analysis. A formal school provides both day and evening sessions of a 330-hour basic programming course which prepares men and women to become entry-level programmers capable of immediate, productive employment.

The course begins by orienting the student to the field of computer programming by combining fundamental skills training with in-depth coverage of the IBM System/360 and 370. Specialization in one high-level computer language—COBOL—is an important aspect of the course. This approach differs from that of most programming schools which tend to teach two or three languages. INSCO's approach better prepares its graduates to be productive in a commercial environment. Assembler Language training is made available to graduates of the school after they have had on-the-job experience using COBOL.

Here is a representative list of some of the courses offered:

*ANS COBOL Language
Data Processing Concepts
Direct Access Storage Devices
Dump Reading and Debugging
Introduction to Modern Large-Scale
Computers*

*Job Control Language
Linkage Editor
Operating Systems
Problem Solving
Programming Fundamentals
Programming Standards
Programming Techniques
Teleprocessing
Utilities*

Other educational services offered include:
*The Programmer Knowledge Survey, a
fully automated test battery for determin-
ing acquired skill levels of OS/VS
programmers*

*Curriculum and Course Design Services
Career Path Consulting
Sale of Source Documentation to compa-
nies setting up or augmenting internal
training capabilities*

Facilities

INSCO operates one of the largest information services networks in North America. The hub of this network is our national headquarters in Neptune, New Jersey. This facility was specifically designed to house large data processing operations.

Magnetic tape libraries are given maximum security treatment and, as a further precaution, INSCO has reserve locations for record storage. 24-hour security guards patrol the premises and control access to critical areas. Fire resistant construction and separation of operating areas provide additional protection.

Data Processing Systems

INSCO's diversified mix of computers and teleprocessing facilities is constantly being expanded, updated and improved. The latest "Fourth Generation" data processing equipment provides the bulk of our processing power. Typical of the facility's high degree of technical advancement is the fact that INSCO was one of the first companies to install and operate System 370s under OS/VS2 (SVS) and VM/370 CMS.

The Neptune facility is equipped with a 3-megabyte IBM 370/168-3; a 3-megabyte 370/158-3 with an attached processor; and a 2-megabyte 360/65 to be replaced by a 370/168. Two IBM 3033's are on order and scheduled for delivery in late 1978 and 1979. In addition, the facility houses approximately 15 billion bytes of direct access storage and an IBM 3800 Printing Subsystem capable of printing at speeds of over 10,000 lines per minute.

INSCO's eight regional offices are equipped with a variety of computers ranging from IBM 360/30's to IBM 370's.

Data Collection and Transmission

INSCO maintains input/output facilities in principal cities across North America. By means of telecommunications, data moves rapidly through the INSCO network... averaging over 2.1 billion characters per month... thus satisfying the most sophisticated user requirements.

Our array of computers and teleprocessing facilities provides for interactive timesharing, and both online and batch modes of processing (local and RJE).

Support

INSCO provides on-the-spot start-up assistance for every application, system and service. Full documentation—manuals and instruction books—are provided as required. We also work with an active "INSCO Users Group" to continually maintain and upgrade our applications and systems.



Repre

Representative Customers

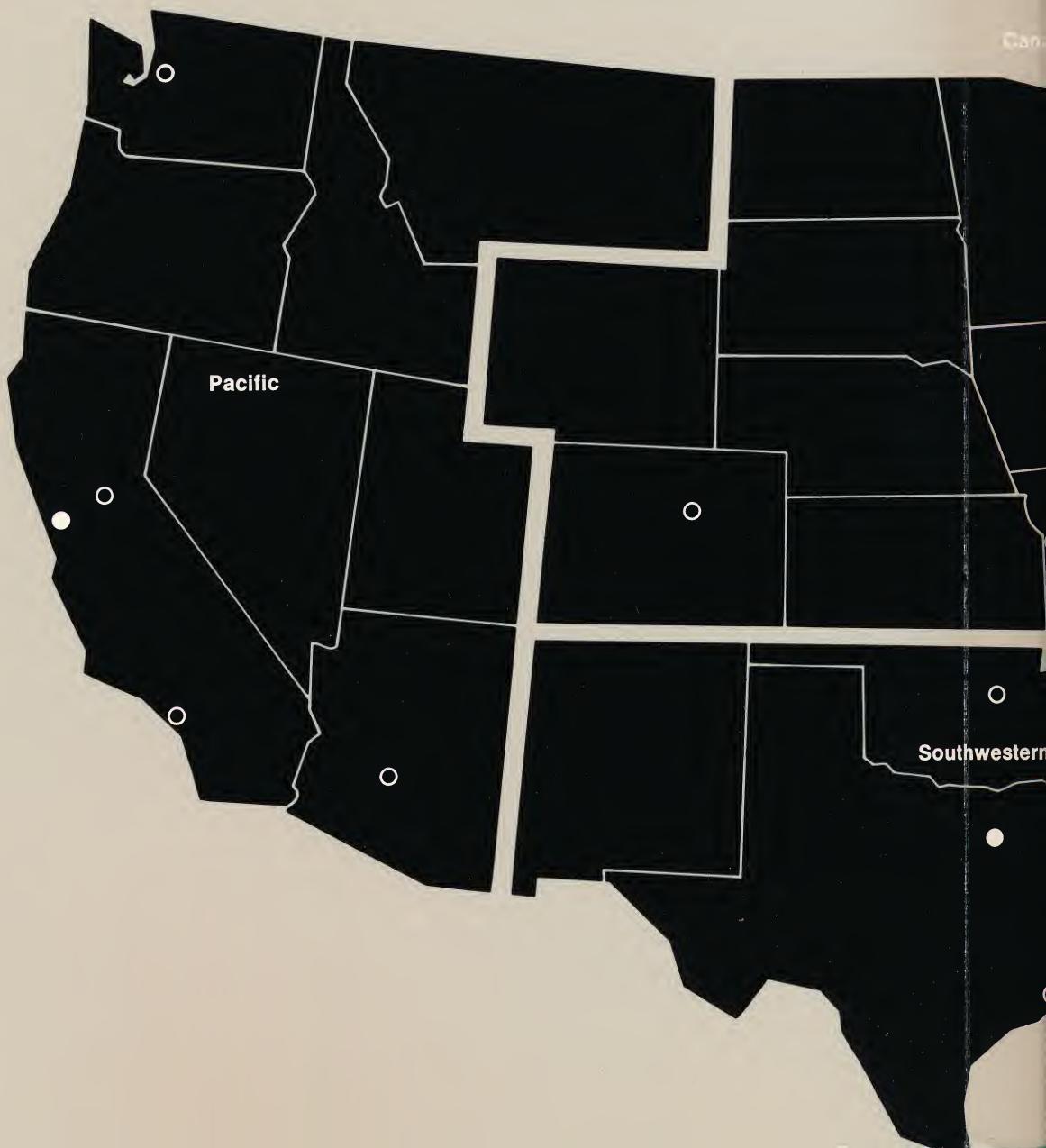
Chase Manhattan Bank
Concord Mutual Insurance Company
Connelly-Campion-Wright Agency
Consolidated Mutual Insurance Company
Contempra Industries Incorporated
Criterion Insurance Company
Cypress Inn
Eagle Star Insurance Company Limited
Equitable General Insurance Company
Fidelity & Deposit Company of Maryland
First American Insurance Company
Gallagher Enterprises
Gambles Insurance Company
General Accident Group of Insurance Companies
General G.M.C. Trucks
Gold Cities Agency
Great American Insurance Company
Hallmark Insurance Company
Hanover Insurance Companies
Home & Automobile Insurance Company
Hughes Aircraft Corporation
Industrial Risk Insurers
I.T.T. Defense Communications Division
Kinney Shoe Corporation
Maccabees Mutual Life Insurance
Manufacturers Hanover Trust Company
Markin-Shaw Agency
The Maryland Casualty Company
McDonnell Douglas Automation
Metropolitan Property & Liability Insurance Company
Molly Pitcher Inn

Monmouth Council, Boy Scouts of America
New Jersey Insurance Underwriting Association
New York Property Insurance Underwriting Association
Northern Illinois Farmers Mutual Insurance Company
Owens-Illinois
Pacific Mutual Life Insurance
Perkins Pancake House
Precision Circuits
Prudential Property and Casualty Insurance Company
Rainier National Bank
Reliance Insurance Company
Riggs National Bank
SYCOR Incorporated
Township of Holmdel
Township of Lacey
United Cleaning Contractors
United Services Automobile Association
United States Fidelity and Guaranty Company
Westernbancorp
White Motors Corporation
Zayre Corporation
Zurich American Insurance Company

The INSCO Network

INSCO offers coast-to-coast service by way of Data Collection Centers located in most major cities in the United States and Canada and 8 Regional Processing Centers. These massive collection, processing and transmission facilities are on the job 24 hours a day.

- Regional Data Processing Centers
- Data Collection Centers
- Headquarters, Neptune, N.J.





INSCO Systems

An affiliate of The Continental Corporation.
Neptune, New Jersey 07753
201 922-1100

For additional information on any of
INSCO's services, write or call the
Business Development Department at
Neptune or any Regional Office.

DATANETWORK

Honeywell's DATANETWORK Service provides remote access to the batch processing and time sharing power of Series 60 (Level 66) and Series 6000. This service is based on Honeywell's proven large-scale, multidimensional systems and GCOS (General Comprehensive Operating Supervisor).

FEATURES

Specifically, the DATANETWORK Service offers:

- Concurrent processing in remote batch and time sharing
- A comprehensive library of remote batch and time sharing programs and systems covering applications in a broad spectrum of disciplines
- All the commonly used language processors
- Common system accessibility for all processing dimensions
- Compatibility with a wide range of terminals and terminal transmission speeds
- Extensive memory capacity, tape handling, and disk storage required for large, sophisticated applications
- Cost based on service and components used
- Complete and current documentation
- A national communications network available on a local dial-up basis from most major cities
- A common data base available from all business locations

BENEFITS

DATANETWORK's power, speed, storage, and flexibility accommodate the demands of modern business as well as offer a new level of flexible processing power.

For example, a company with a number of remote branches can maintain common files for business processing purposes. Each branch can have access to the common files for storage, retrieval, updating, billing, report production, or any number of other jobs. In addition, independent, decentralized development of common application systems is possible by means of shared access to the central files and resources.

**DATANETWORK
Service Overview**

Interaction with batch programs from remote keyboard terminals is also provided. A large-system capability is available for processing large and/or complex programs that require more memory than an in-house facility can provide. Program development activities can be performed on the network without cramping or hindering in-house computer facilities.

PROGRAMMING LANGUAGES

A full complement of programming languages is available to DATANETWORK users. In remote batch the Series 60 (Level 66) and Series 6000 computers make use of:

FORTRAN
COBOL
GMAP
ALGOL
JOVIAL
APL

And in time sharing they utilize:

FORTRAN
BASIC
dataBASIC
TEX and TEXT EDITOR
APL

SYSTEM DESCRIPTION

Functional modularity is the key feature of Honeywell's Level 66 and Series 6000 multidimensional systems. These systems represent the optimal blend of CPU speed, memory capacity, I/O speed, and communications flexibility — features designed to perform a multitude of scientific and business data processing jobs on the network.

DATANETWORK is supervised by Honeywell's GCOS. This advanced operating system maintains automatic supervision and complete control of the multiprogramming/multiprocessing environment. GCOS offers:

- Resources Management — allocates only the necessary resources for each job to minimize user costs

- Ease of Use – provides programmers with a complete and logical interface to their programs and file structures
- Data Base Management – provides the GCOS file system supporting a permanent online repository for files with access from all dimensions of processing
- Security Control – prevents unauthorized access of data files, memory areas, and programs
- Job Scheduling – schedules user jobs for concurrent execution, thereby minimizing turnaround time for the remote user

REMOTE PROCESSING

DATANETWORK's remote processing capabilities include remote batch, remote access, and time sharing.

Remote Batch Processing

Remote batch processing places the extensive resources of a large data processing facility within the user's work area in the form of one or more keyboard terminals, a small central processor, or a remote job terminal.

Any job that can be entered directly at the central system can be entered from a remote terminal. A remote batch job differs from a local batch job only in the GCOS job I/O routines that interface with the communications processor. Once inside the central system, local and remote batch processing are identical.

Remote batch jobs have several available options for the output files they generate. These options, selected by control cards, are as follows:

- Return to Sending Terminal – This option might be used for small jobs such as compilation listings/diagnostics.
- Hold Until Terminal Calls Back – With this option the terminal is freed for other uses while the job is being processed.
- Output at Central Site – When voluminous reports or other time-consuming print jobs are needed, they can be produced on DATANETWORK's central high-speed printers (and mailed to the user).
- Send to Another Terminal – The report produced by a job can be directed to a user branch site. Or, if the job originates on a keyboard terminal, the output can be directed to a batch terminal with a line printer.
- Enter Into File System – The job output is stored in the file system for later perusal.

Remote Access Processing

Conversational remote batch (remote access) capabilities of DATANETWORK satisfy the requirements for data base inquiry, remote data base management, and data collection.

Remote access provides direct terminal access to a program in execution. The program, written in any batch programming language (FORTRAN, COBOL, GMAP, etc.), can be submitted as a job by remote batch or time sharing/batch interface (e.g., CARDIN).

The terminal in remote access effectively becomes an online peripheral to the activity in process. This activity can send to (and receive from) the terminal(s).

Time Sharing Processing

DATANETWORK provides time sharing services without disrupting remote batch and remote access commitments. The portion of the computer dedicated to time sharing processing options is variable throughout the processing day.

All the catalog structuring, file storage, file protection, file sharing, and access control capabilities of the file system are available to users. A special catalog/file maintenance routine is provided to perform these functions from a time sharing terminal.

The Time Sharing Executive performs various services for individual programs (including file system I/O and terminal I/O) for the creation and modification of files, catalogs, and their security definitions. It also accounts for resources used by individual time sharing users.

DATANETWORK provides the standard time sharing capabilities (BASIC, FORTRAN, a powerful text editor, and a comprehensive library of programs and subroutines) supplemented by specialized capabilities such as I-D-S (I and II) and the dataBASIC language. These special capabilities simplify the development of terminal applications. In addition, DATANETWORK time sharing complements remote batch processing through a time sharing/batch interface – an effective tool for expediting the development of batch applications.

TIME SHARE/BATCH LIBRARY

The DATANETWORK Time Share/Batch Library of programs and routines is acquired and supplied from various sources. DATANETWORK has a continually expanding library of third-party referral

software as well as applications provided by Honeywell software distribution. To maintain state of the art, DATANETWORK acquires compilers and operating systems as soon as available from Honeywell software distribution. To ensure transferability to other Level 66 and Series 6000 hardware, all Honeywell software is implemented without modification.

Time Sharing Library

Honeywell's DATANETWORK Time Sharing Library contains hundreds of tested programs for solving problems in many disciplines. Programs range from small time sharing routines to larger programs that use existing data files, and to complete problem-solving applications.

Remote Batch Library

The DATANETWORK Remote Batch Library contains a large variety of operational application programs and systems which encompass such areas as business and finance, engineering and science, manufacturing, simulation, and forecasting.

Summary of Library Programs

Remote Batch Applications

Financial Management

- Cash Management System
 - Bank Analysis Reporting (BAR)
 - Cash Analysis Reporting (CAR)
 - Honeywell Automated Borrowing and Investment Technique (HABIT)
- Financial Planning Simulation

Manufacturing

- Inventory Management System (IMS/66)
- Production Scheduling and Control (PSC/66)
- Automatically Programmed Tools (APT/66)

Management Science

- Mathematical Programming System (MPS)
- GPSS
- SIMSCRIPT
- X-11 Variant of the Census Method II

Project Management and Control

- Automatic Scheduling with Time-Based Resource Allocation II (ASTRA II)
- Project Management and Control System (PMCS/66)

Statistics and Mathematics

- Biomedical Statistical Programs (BMD)
- Biomedical Statistical Package (BMDP)
- Statistical Package for the Social Sciences (SPSS)
- International Mathematical and Statistical Library (IMSL)

Engineering

- Numerically Integrated Elements for System Analysis (NISA)
- Automated Data Analyzer (ADA)
- Coordinate Geometry (COGO)
- SPICE

General Applications

- Concordance Generator Program
- Individualized Mathematics Instruction (IMI)
 - Arithmetic Text Generator (ATG)
 - Individualized Mathematics Program (IMP)
- Resources Information System (RIS)

Time Sharing Applications

The library contains more than 250 programs, functions, and subroutines in either FORTRAN or BASIC.

Time Sharing Library

- Mathematics
- Statistics
- Business and Finance
- Management Science and Optimization
- Engineering
- Geometric and Plotting

Support Applications

- Text Processing (TEX)
- Text Editor
- Plotting and Graphics
- Conversion Aid Programs

SUMMARY OF DATANETWORK FEATURES

- Fast turnaround time in remote batch mode; immediate turnaround in time sharing
- Convenience and time saving with direct and immediate system accessibility
- Economy, because users pay only for the computer power needed
- Back-up facilities to provide for in-house operations including overload periods
- Data collection and program development capabilities

- File and program conversion aids to accelerate the installation of new systems
- Access to the entire Level 66 and Series 6000 standard library of programs and to other proprietary applications
- Big-computer power without a large capital outlay
- Multiterminal and multilocation access to a centrally located and highly maintained system with a common file base
- File protection and safeguards with the option of several levels and types of accessibility

Specifications may change as design improvements are introduced.

Honeywell

Honeywell Information Systems

In the U.S.A.: 200 Smith Street, MS 486, Waltham, Massachusetts 02154
In Canada: 2025 Sheppard Avenue East, Willowdale, Ontario M2J 1W5
In Mexico: Avenida Nuevo Leon 250, Mexico 11, D.F.

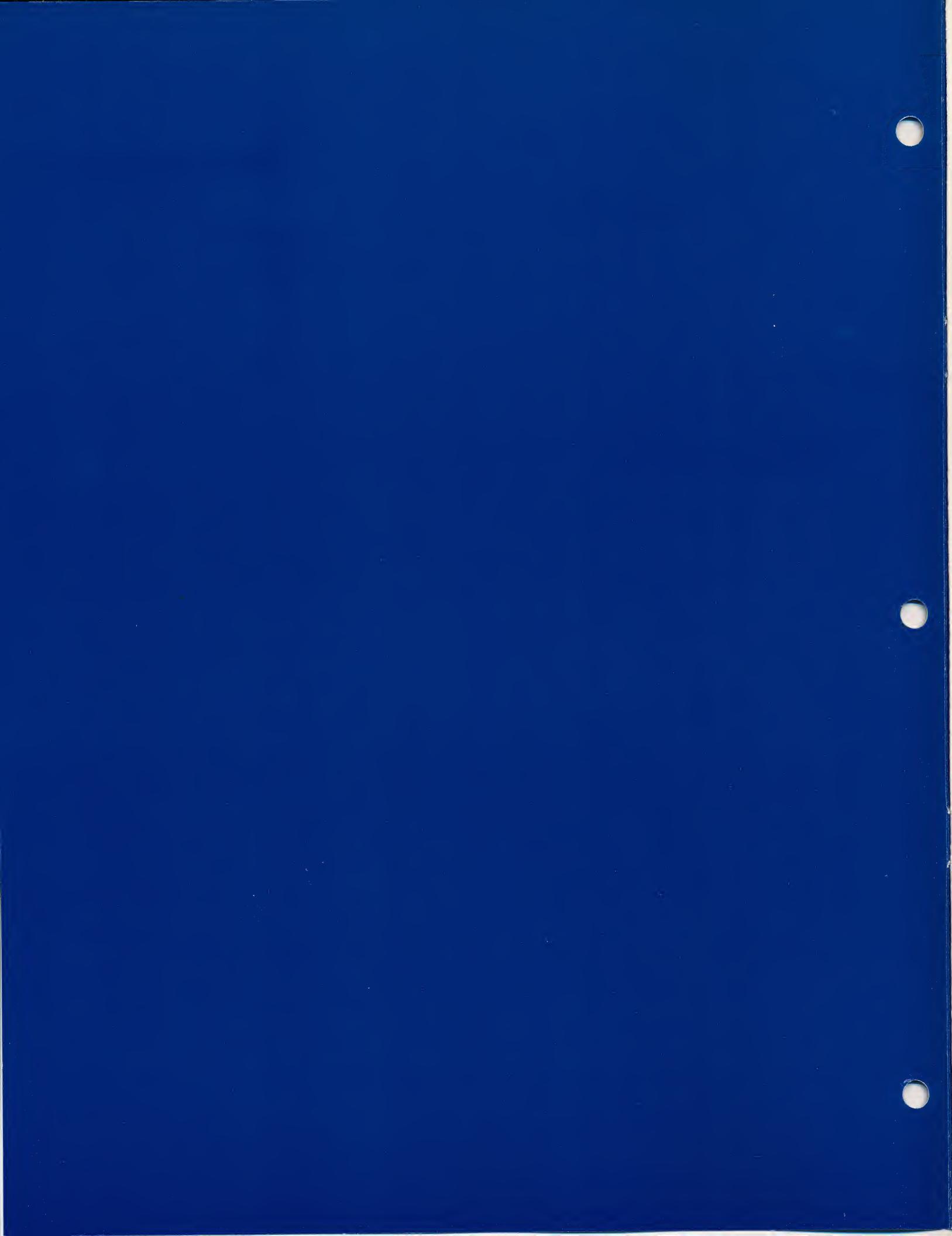
22016, 11078, Printed in U.S.A.

AH87, Rev. 2



UNIVERSITY COMPUTING COMPANY

ONLY A PHONE CALL AWAY

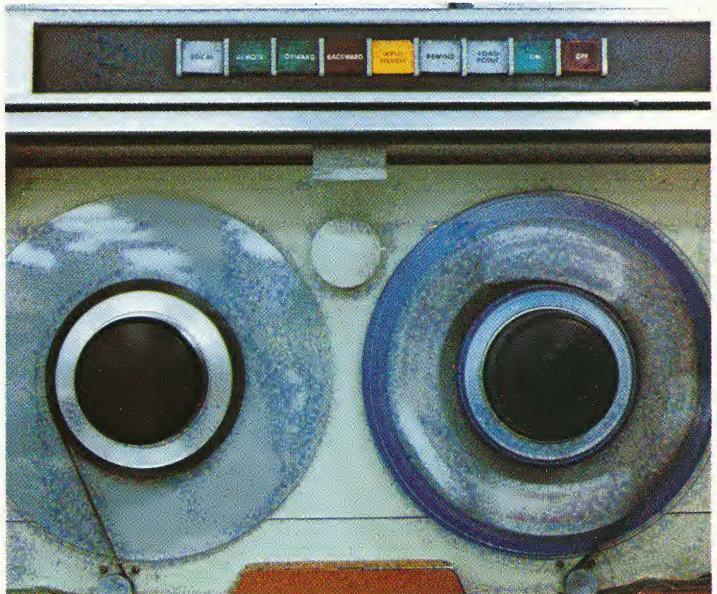


Could a telephone call solve your data processing problem?

It could if you called 214/655-8894. UCC offers solutions through its extensive hardware systems and applications library. More important, however, are the hundreds of man years of experience in solving customer problems.

Quick response, technical expertise, and cost-effective solutions are yours if you dial the UCC number.

Please take a few minutes to learn more about UCC. We will be waiting for your call.



HISTORY

University Computing Company was founded in 1963 on the campus of Southern Methodist University. Since that time, the company has grown into a major international supplier of computer services. This growth was nurtured by sensitivity to the expanding requirements of our customers and the ability to respond with innovative solutions.

UCC's technical staff pioneered concepts in equipment and software design to provide convenient remote terminal access. During recent years, the service has been transformed from several small computer centers to today's supercenter in Dallas, Texas, which houses eight large scale hardware systems.

The power of the computer facilities has been expanded through a wide range of industry-accepted, problem solving applications. These

applications embrace disciplines from engineering design to manufacturing control. UCC's years of experience in providing a complete service have resulted in the creation of an impressive staff of technicians whose depth of knowledge in both systems and applications greatly enhances your productivity.

...UCC's computer services, software, and years of experience are available to you today...



INDUSTRIES SERVED

3

We don't have all the answers for **every** industry, but we do have the right answers for many industries.

The diversity of capabilities at UCC provides our customers the competitive edge, whether it is in:

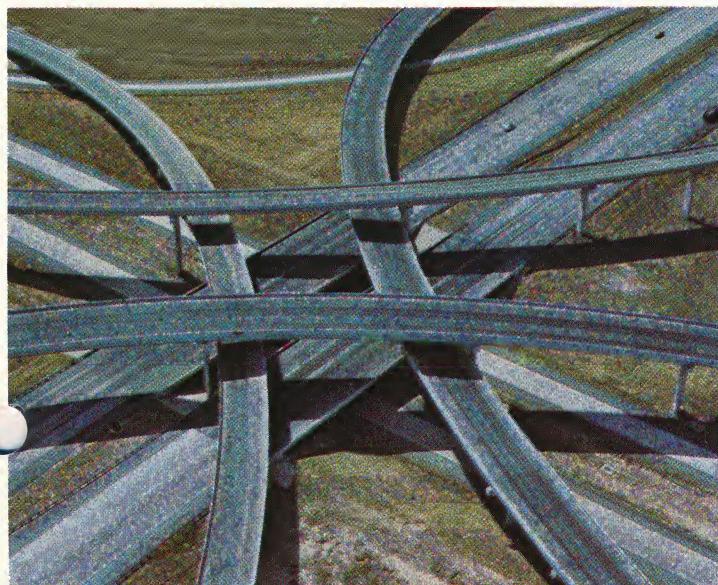
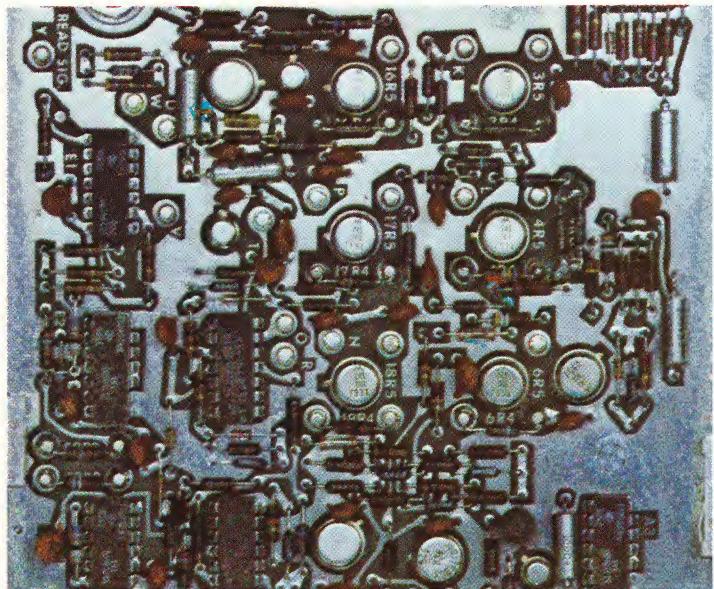
- Designing circuit boards or building bridges
- Cutting gears or launching satellites
- Analyzing oil refineries or scheduling projects
- Optimizing investments or maintaining inventories.

We have the software, hardware, and people to support your project. Many of our customers' names can be found in the Fortune 500. They are in businesses such as:

- | | |
|---|---|
| <ul style="list-style-type: none">• Aerospace• Heavy Equipment• Petroleum• Financial• Engineering Consulting and Design | <ul style="list-style-type: none">• Construction• Electronics• Government• Manufacturing• Utilities• Printing and Publishing |
|---|---|

Even though the businesses and industries of our customers are diverse, they all share one thing in common — the need for fast, cost-effective solutions to problems. Many customers have their own in-house computer systems, but they still look to UCC for systems back-up, and for high performance applications not otherwise available.

No matter what your business is, if you have a data processing problem, think of UCC. Chances are we have the capabilities to provide fast, economical solutions.



APPLICATIONS

UCC's library of problem solving software provides a wide range of service capabilities. Many of the applications programs are unique to the company and have been developed internally or acquired from industry-specialized experts to meet the needs of customers. Some applications, N5500 for example, work effectively in many disciplines. Applications software is available to solve problems in areas such as:

- Structures
- Piping
- Project Control
- Management Sciences
- Nuclear
- Numerical Control
- Electronics
- Data Base Management
- Process Design
- Heat Transfer
- Chemical
- Vessel Design
- Civil Engineering
- Building Design

The most recent innovation in applications software services is the availability of UCC's Numerical Control Software for customers in-house use on mini computers or large scale processors. This is simply another step in the adaptability of services to meet the changing needs of customers.



You can enjoy the benefits of having your own computer center without incurring the cost of equipment or bearing the burden of support. Your ability to react to problem solving needs is as easy as access to UCC's five Univacs, two Control Data, IBM 370, or 10 mini computer systems. This wide variety of hardware permits you to select the system which will process your applications most efficiently. This will save you time...and money.

Our large-scale hardware is configured with coupled mainframes for backup to ensure that the system is available when it is needed to meet critical deadlines. Our own staff of engineers supervise hardware maintenance to increase reliability. These factors enable UCC to maintain consistent availability in excess of 98% of scheduled operation time. Coupled mainframes also mean quick response or turnaround...a response time that can be user controlled for cost-effective processing.

Through operating software enhancements and utilities, the systems provide an environment in which problems can be easily solved with little or no computer programming knowledge.



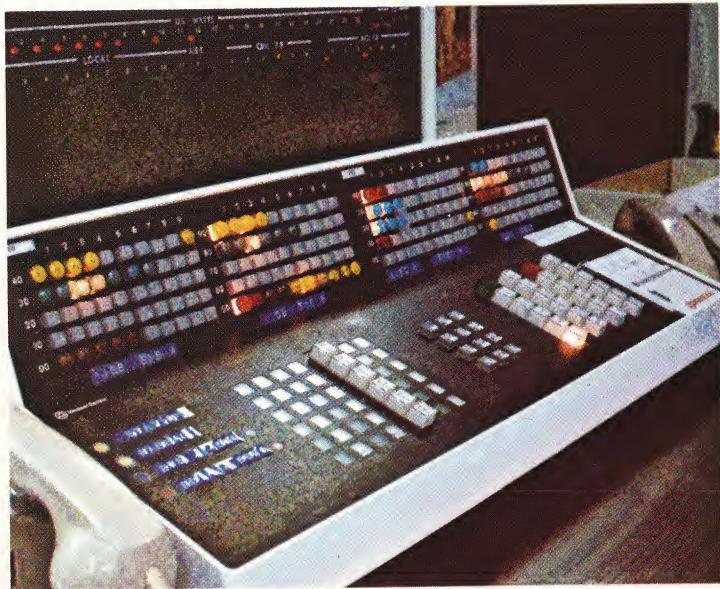
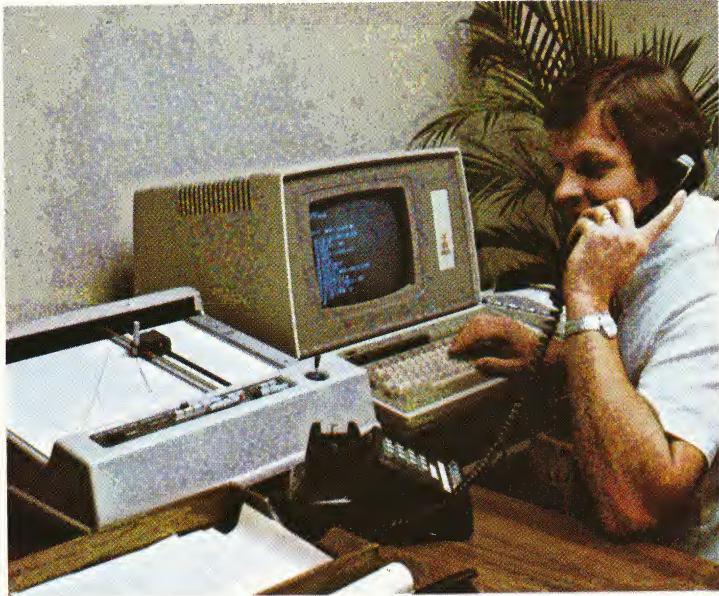
ACCESS

These hardware systems are as near as your telephone. It will let you access the integrated communications network that reaches all major metropolitan areas in the United States and Canada. Multiple communications sources provide both reliability and convenience.

The network supports flexible access. You can enter the system through low or high speed terminals. Regardless of the mainframe accessed, we communicate with most industry available terminal types. There is even a choice of remote batch or interactive communications. Also, you can process over the counter at any of our field offices or the supercenter.

For convenience, all hardware systems, except the IBM 370, are accessible from a single low or high speed terminal. Through a sophisticated switching interface, a user can

successively communicate with the system that best solves each type of problem...and all through a single phone call.



In the final analysis, people are the fabric of any organization. This is especially true at UCC. Maintaining and supporting the UCC systems complex to provide the best in services requires professionals in many disciplines.

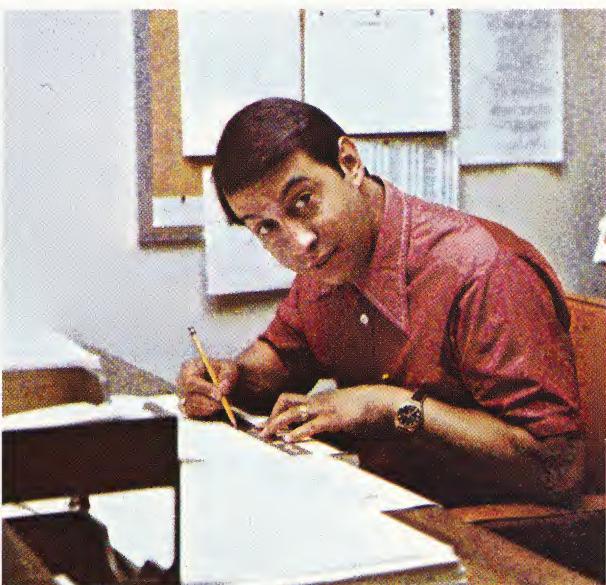
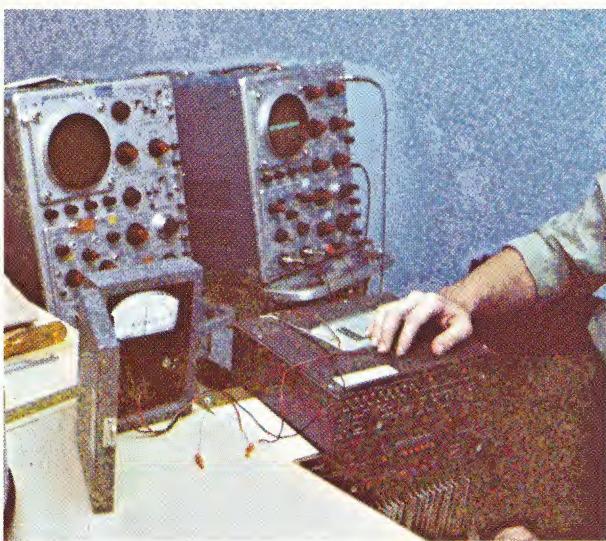
The people most visible and valuable to you are the system generalists and applications specialists. Their knowledge and experience is available to you on four levels:

- Local – support and training at your site or locally for day-to-day questions
- National – specialists to provide additional systems and applications support
- Vendor – direct support by the experts who developed the programs
- Consultants – under contract to UCC to provide in-depth consulting on complex problems.

In addition to our technical support representatives, we have a large staff of specialists you probably won't have the opportunity to meet. They are working behind the scenes to provide you with the capabilities and systems you need to solve your problem. Some of these specialists include:

- Hardware and communications engineers who maintain most of our equipment.
- Software specialists who develop and maintain the utilities and operating systems software. Much of our software has been adapted specifically for the unique needs of a computer services environment. And since we helped pioneer this industry, we know what it takes.
- Operations which is an integral link in the support chain. Our skilled staff is the key to maintaining a smooth, efficient operating environment. They are your guarantee to rapid response and quick turnaround.

All of our support people are available to make the system easy for you to use. When you need us, we're only a phone call away.



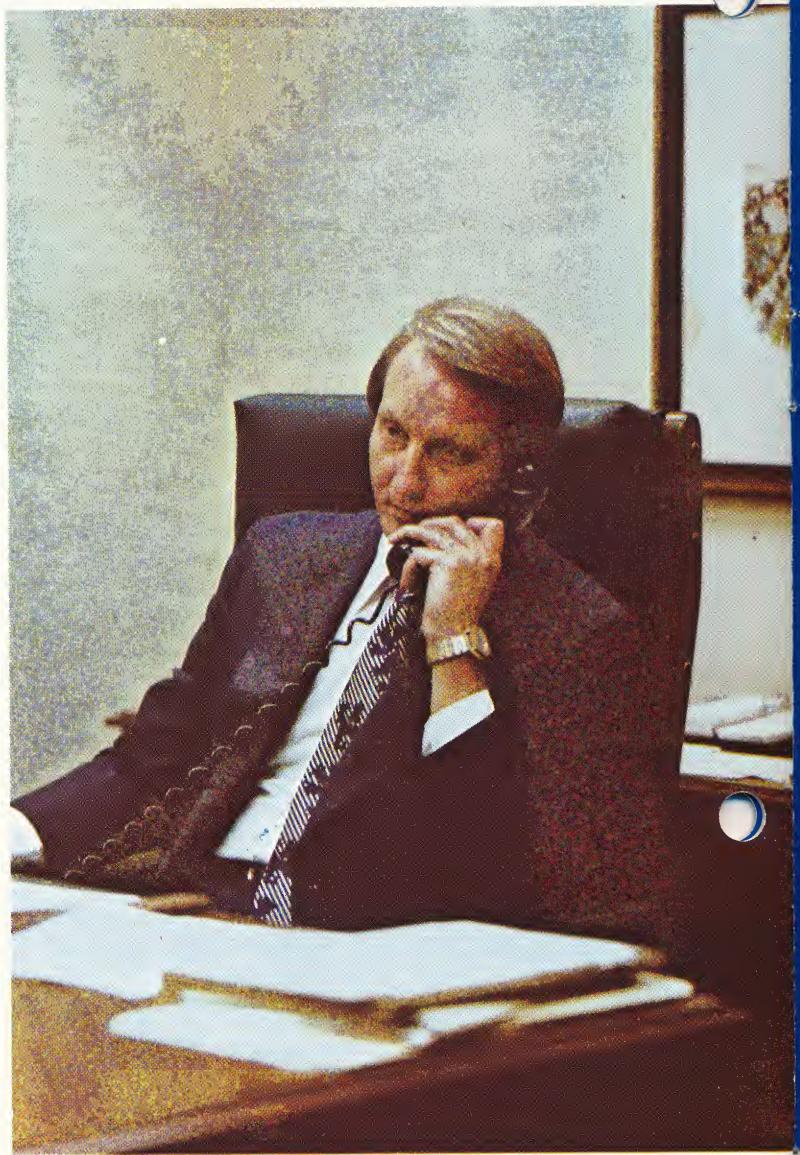
SUMMARY

University Computing Company
can provide you with:

- A broad range of industry accepted applications
- Flexible hardware and operating systems
- Convenient communications access
- Multi-level applications and systems technical support.

In short...we can assume total responsibility for
your problem solving needs.

Give Us A Call Today



DIVISION HEADQUARTERS

1930 HiLine Drive
Dallas, Texas 75207
4/655-8894

SALES OFFICES

BOSTON 617/272-6350

3 New England Executive Park
Burlington, Massachusetts 01803

CHICAGO 312/368-0995

120 South Riverside Plaza
10th Floor
Chicago, Illinois 60606

DALLAS 214/655-8609

1930 HiLine Drive
Dallas, Texas 75207

DETROIT 313/879-9300

5600 Crooks Road
P.O. Box 58
Troy, Michigan 48099

HOUSTON 713/961-3444

4801 Woodway
Suite 140 West
Houston, Texas 77056

LOS ANGELES 213/322-3093

888 North Sepulveda Blvd.
El Segundo, California 90245

NEW YORK 212/421-8850

747 Third Avenue
32nd Floor
New York, New York 10017

NORTH BRUNSWICK 201/828-3900

10 U.S. Rt. 1
1st Floor
North Brunswick, New Jersey 08902

SAN FRANCISCO 415/421-6240

44 Montgomery Street
Suite 2870
San Francisco, California 94104

SEATTLE 206/453-8829

1450 114th Ave. S.E.
Suite 114
Bellevue, Washington 98004

ST. PETERSBURG 813/576-7373

9500 Gandy Boulevard
Suite 206
St. Petersburg, Florida 83702

TULSA 918/582-0975

823 South Detroit
Tulsa, Oklahoma 74120

WASHINGTON, D.C. 703/790-1560

7777 Leesburg Pike
Suite 219
Falls Church, Virginia 22043

TORONTO, CANADA 416/444-4471

101 Duncan Mill Road
Suite 404
Don Mills, Ontario, Canada M3B 1Z3

EUROPEAN OFFICES

AUSTRIA IRELAND

BELGIUM NETHERLANDS

FRANCE SWITZERLAND

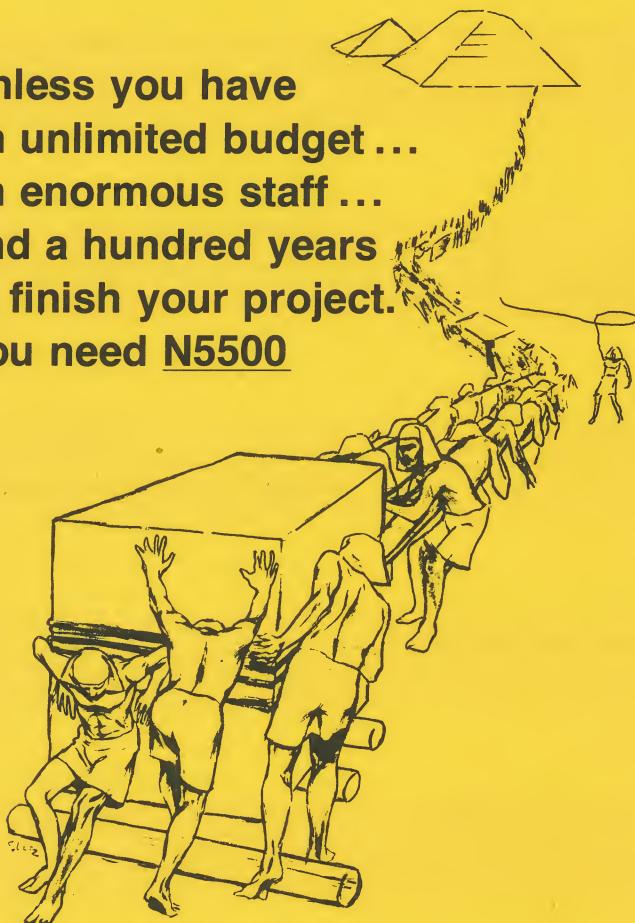
GERMANY UNITED KINGDOM



Now exclusively available on UCC's network — Nichols & Company N 5500

N 5500

Unless you have
an unlimited budget ...
an enormous staff ...
and a hundred years
to finish your project.
You need N5500



Much has changed over the years. Today, before a project begins, management wants to know when it will be finished and how much it's going to cost. Management expects, even demands, that costs and completions occur as promised. The pressure on project management to perform better is steadily increasing. Improved tools are urgently needed to reduce the project manager's load.

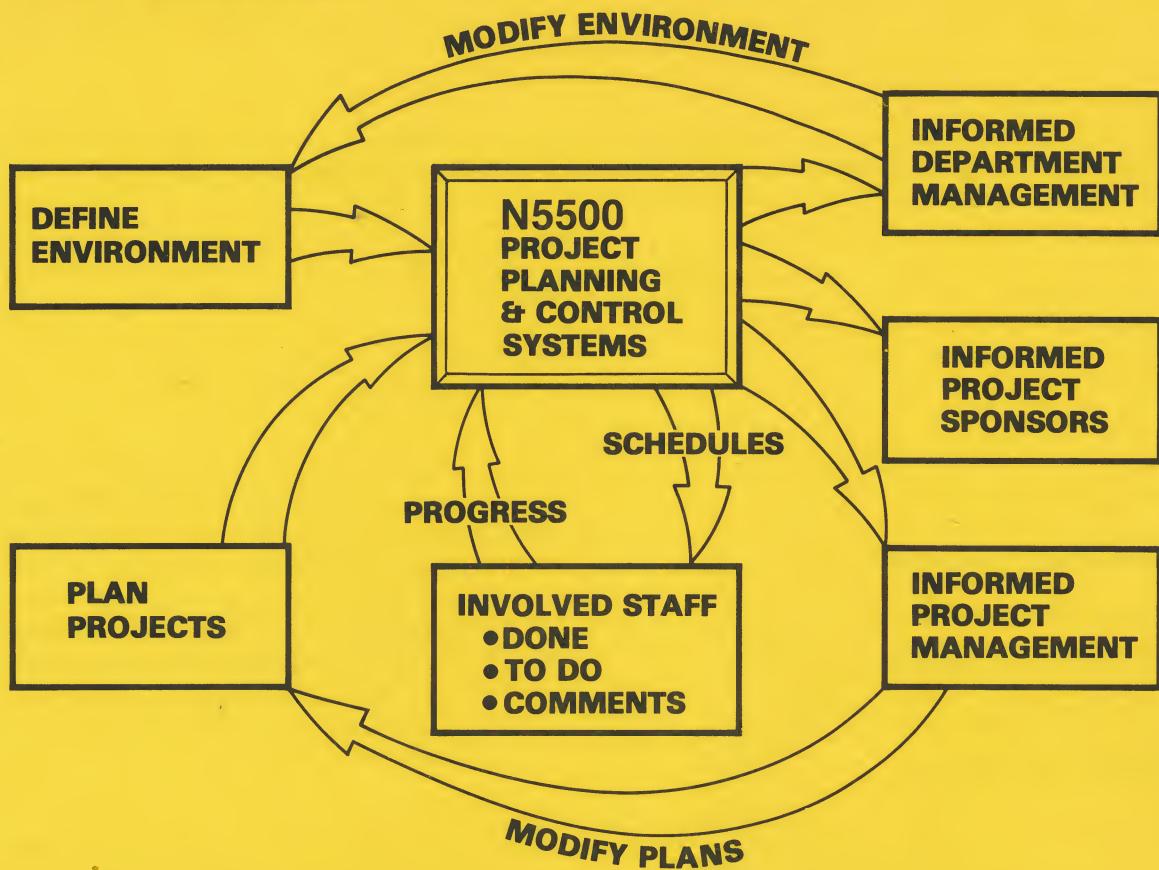
Only one series of automated systems stands out above all others in meeting today's needs.

N5500 PROJECT PLANNING AND CONTROL SYSTEMS enable project leaders and managers to successfully plan and control their projects. These systems dramatically improve planning efficiency, highlight future loads, and quickly indicate potential problem areas.

PROJECT PLANNING AND CONTROL SYSTEMS, **TOTAL project management systems, offer:**

- Automatic Network Management
- Critical Path Management
- Both Process and Event Networking
- Variable Resource Load Smoothing
- Total Resource Accounting and Commitments
- Reporting for Matrix Organization
- Automatic Project Generation
- Unlimited "what if" Simulation
- Substantial Audit Capability
- Daily Automatic Load Leveling
- Extensive Data Validation
- Weekly Turnaround Progress Statements
- Easy, uncomplicated use
- Network Plotting

THE PROCESS



UNIVERSITY COMPUTING COMPANY SCIENTIFIC AND ENGINEERING OFFICES

CALIFORNIA

888 North Sepulveda Blvd.
El Segundo, California 90245
213/322-3093

44 Montgomery Street
Suite 2870
San Francisco, California 94104
415/421-8240

FLORIDA

9500 Gandy Boulevard
Suite 206
St. Petersburg, Florida 33702
813/576-7373

ILLINOIS

120 South Riverside Plaza
10th Floor
Chicago, Illinois 60806
312/368-0995

MASSACHUSETTS

3 New England Executive Park
Burlington, Massachusetts 01803
817/272-6350

MICHIGAN

5600 Crooks Road
P.O. Box 58
Troy, Michigan 48099
313/879-9300

NEW JERSEY

850 U.S. Rt. 1
4th Floor
North Brunswick, New Jersey 08902
201/828-3900

NEW YORK

747 Third Avenue
32nd Floor
New York, New York 10017

OKLAHOMA

823 South Detroit
Tulsa, Oklahoma 74120
918/582-0975

TEXAS

1930 Hi Line Drive
Dallas, Texas 75207
214/655-8609

4801 Woodway
Suite 140 West
Houston, Texas 77056
713/961-8444

VIRGINIA

7777 Leesburg Pike
Suite 219
Falls Church, Virginia 22043
703/790-1560

WASHINGTON

1450 114th Ave. S.E.
Suite 114
Bellevue, Washington 96004
206/453-8829

CANADA

101 Duncan Mill Road
Suite 404
Don Mills, Ontario M3B 1Z3
416/444-4471

EUROPEAN OFFICES

Austria
Belgium
France
Germany
Ireland
Netherlands
Switzerland
United Kingdom

UCC
UNIVERSITY COMPUTING COMPANY
Scientific & Engineering Division
1930 HiLine Drive
Dallas, Texas 75207
214/655-8894

THINK UCC

If you are in the planning stage trying to select the best possible mathematical programming system for your needs, or, are looking for back-up or better turnaround for your existing UNIVAC FMPS operation.

ACCESSIBILITY

FMPS is fully operational on UCC's multi-computer network giving you the advantages of a proven product and full network accessibility worldwide.

TURNAROUND/PRICE PERFORMANCE

UCC's Exec 8 service guarantees you unparalleled turnaround and excellent price performance as a result of its multi-programming environment where you pay only for the core you use. Exec 8 also provides you the convenience of utilizing disc storage for your input files.

SUPPORT

UCC provides a national support staff of mathematical programming consultants available to guide you through all phases of design and implementation.

GO WITH THE LEADER

Since its foundation in 1963, UCC has grown into a world leader in Remote Computing Services by combining advanced large-scale computer technology blended with the newest data communications, remote terminal capability and the best service and software in the industry.

UCC
UNIVERSITY COMPUTING COMPANY
Scientific & Engineering Division
1930 Hi-Line Drive
Dallas, Texas 75207
(214)655-8894

UCC
UNIVERSITY COMPUTING COMPANY
Scientific & Engineering Division

FMPS

3 New England Executive Park
Burlington, Massachusetts 01803
(617)272-6350

120 South Riverside Plaza, 10th Floor
Chicago, Illinois 60606
(312)368-0995

1930 Hi-Line Drive
Dallas, Texas 75207
(214)655-8894

850 U.S. Rt. #1, Fourth Floor
North Brunswick, New Jersey 08902
(201)828-3900

888 North Sepulveda Boulevard
El Segundo, California 90245
(213)322-3093

44 Montgomery, Suite 2870
San Francisco, California 94104
(415)421-6240

7777 Leesburg Pike, Suite 219
Falls Church, Virginia 22043
(703)790-1560

Suite 140 West
4801 Woodway
Houston, Texas 77056
(713)961-3444

747 Third Avenue, 32nd Floor
New York, New York 10017
(212)421-8850

5600 Crooks Road
One Northfield Plaza
Troy, Michigan 48084
(313)879-9300

823 South Detroit
Tulsa, Oklahoma 74120
(918)582-0975

1450-114th Ave. S.E., Suite 114
Bellevue, Washington 98004
(206)453-8829

European Offices

Austria
Belgium
France
Germany
Ireland
Netherlands
Switzerland
United Kingdom

9500 Gandy Boulevard
Suite 206
St. Petersburg, Florida 33702
(813)576-7373

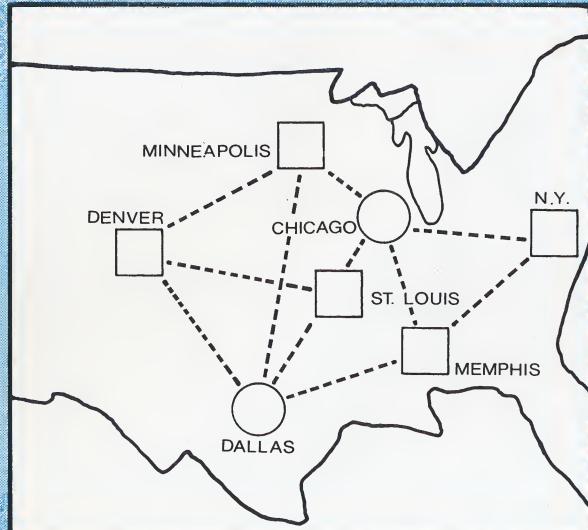
101 Duncan Mills Rd., Suite 404
Don Mills Ontario, Canada M3B1Z3
(416)444-4471

Functional Mathematical
Programming System

Are questions like these part of your everyday business decisions?

- What must the price of a raw material be in order for it to be profitably included in your specific manufacturing operation?
- What would you do if one of your major raw materials suddenly became unavailable? How would you determine the best alternative/the most cost effective?
- How can your products be transported to multiple sites in required volume, in the most economical manner?
- Of all the processes in which your company engages, which ones should be expanded to provide you the best possible return on money invested?
- In your blending operation how much of which components should be used to meet quality specifications most economically for your products?
- Considering the marketplace, what mix of products should you manufacture for maximum profit, considering the constraints imposed by limited capacity.

FMPS can provide you the answers!!



FMPS

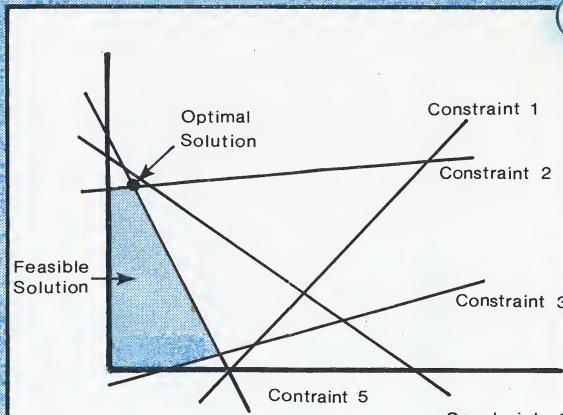
(The Functional Mathematical Programming System)

In essentially any business situation, management faces a variety of economic alternatives which must be examined thoroughly before sound financial and operational decisions can be made.

FMPS offers you "state-of-the art" mathematical programming techniques and algorithms that allow you to make those decisions based on the best combined knowledge of UCC, Univac and Bonner & Moore.

The design of this advanced system recognizes that industry and business require a variety of optimization techniques for efficient solutions of scheduling, planning, blending and transportation type problems. **FMPS** has been designed as a series of modules, permitting you to select only those techniques most directly useful to your operation or analysis. Special purpose algorithms may also be developed and added to **FMPS** because of its open-ended design.

FMPS is a series of building blocks from which a complete mathematical programming system, including independent input and output procedures, can be fashioned or it may be used as the optimization section of an existing model or simulation system.



product mix for maximum profit based on capacity and availability of resources

FMPS contains the following optimization procedures:
(* System Operating Modes)

• LINEAR PROGRAMMING ALGORITHM

which contains multiple pricing, upper and lower bounding, and range constraint capabilities. The inversion technique uses a triangularization scheme which is one of the most advanced in the industry.

• GENERALIZED UPPER-BOUNDED ALGORITHM

designed to solve linear programs with $M+L$ equations, L of which have the property that each variable has, at most, one non-zero coefficient. This algorithm treats each of the L rows implicitly, effectively reducing problem sizes.

• MIXED INTEGER ALGORITHM

which uses a 0-1 Branch-and-BOUND MIP with Special Ordered Sets

• SEPARABLE ALGORITHMS

• NON LINEAR ALGORITHMS

In addition to optimization procedures, **FMPS** also provides modules for data file management, matrix generation and report writing.

GAMMA 3

• DATA FILE MANAGEMENT — provides for the collection, manipulation, and maintenance of data in the lists and data tables.

• MATRIX GENERATION — interfaces with data files and generates problem structures. Contains capability for full matrix generation.

• REPORT WRITING — provides a data driven report writer that can automatically respond to program changes and compare multiple solutions.

TOMORROW IS HERE . . . with THE SWITCH

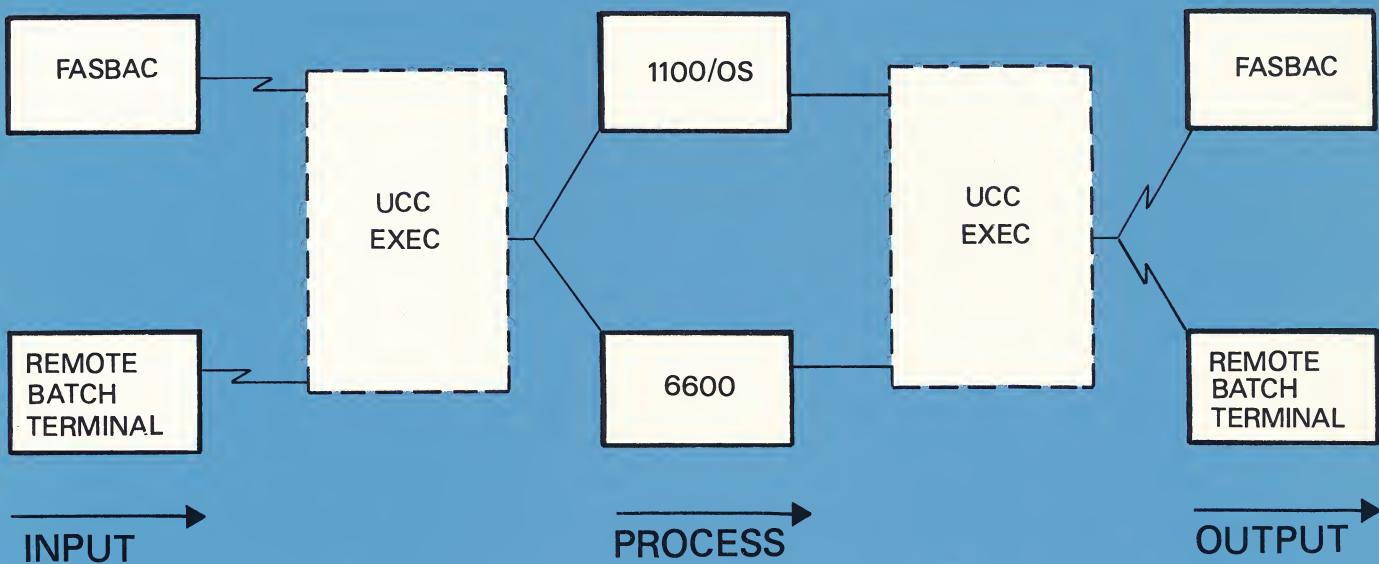
AT UCC THE FUTURE IS OUR BUSINESS — Our software technology and computer services are at the leading edge of the data processing industry.

AND OUR TRADITION IS TO STAY AHEAD — We are proud to provide our customers the latest and best answers to their computing needs.

THE SWITCH is another innovative idea which UCC has already made into a reality —

The Switch provides UCC customers access to all of our powerful Univac 1108 and CDC 6600 computers and the 1100/OS and NOS/BE operating systems — merely by the insertion of a single card at the front of a job deck!

THE SWITCH



From one terminal, you can now mix jobs in your card reader to run on either the 1108's or the 6600's. Any UCC timesharing customer may multiprocess into different mainframes in a single run stream. THE SWITCH makes it happen!

Customers with terminal access to the Univac 1108's under UCC-EXEC may submit jobs and receive output to 1100/OS and the CDC 6600 without rebooting or reconnecting. The Switch also allows interactive terminal FASBAC users to submit jobs and receive output to 1100/OS or NOS/BE.



One of the commands below on one card at the front of your job deck puts THE SWITCH to work for you:

@8 RUN (1100 - 1100/OS)
@6 RUN (6600 - NOS/BE)

CALIFORNIA
888 North Sepulveda Blvd.
El Segundo, California 90245
213/322-3093

44 Montgomery Street
Suite 2870
San Francisco, California 94104

FLORIDA
9500 Koger Boulevard
Suite 206
St. Petersburg, Florida 33702
813/576-7373

ILLINOIS
120 South Riverside Plaza
10th Floor
Chicago, Illinois 60606
312/368-0995

MASSACHUSETTS
3 New England Executive Park
Burlington, Massachusetts 01803
617/272-6350

MICHIGAN
5600 Crooks Road
P.O. Box 58
Troy, Michigan 48084
313/879-9300

NEW JERSEY
850 U.S. Rt. 1
4th Floor
North Brunswick, New Jersey 08902
201/828-3900

NEW YORK
747 Third Avenue
32nd Floor
New York, New York 10017
212/421-8850

OKLAHOMA
823 South Detroit
Tulsa, Oklahoma 74120
918/582-0975

TEXAS
1930 Hi Line Drive
Dallas, Texas 75207
214-655-8609

WASHINGTON
4801 Woodway
Suite 140 West
Houston, Texas 77056
713/961-3444

CANADA
101 Duncan Mill Road
Suite 404
Don Mills, Ontario M3B 1Z3
416/444-4471

EUROPEAN OFFICES

Austria
Belgium
France
Germany
Ireland
Netherlands
Switzerland
United Kingdom

UCC
UNIVERSITY COMPUTING COMPANY
Scientific & Engineering Division
1930 HiLine Drive
Dallas, Texas 75207
214/655-8894

CTS

Conversational Time Sharing

**UNIVERSITY
COMPUTING
COMPANY**



CIS CONVERSATIONAL TIME SHARING from University Computing Company

Now you don't need a costly in-house data processing center to have sophisticated computing power at your finger tips. UCC's Conversational Time Sharing service gives you the same benefits at far less cost.

**You Will Have Fast Responses When You Want Them.
You'll Be Able To:**

- Make informed decisions
- Respond to management inquiries
- Submit timely reports
- Provide expert analyses
- Meet the demands of competitive situations

The information you require to effectively control, manage, and plan your business will be there when you need it.

UCC's Conversational Time Sharing service is available through an extensive communications network providing access to our UNIVAC 1100 system from more than 200 major cities in North America, Europe, and the Far East. This new interactive terminal service, along with our existing remote batch system on 1100/OS, provides our customers with a full computer services offering.

A major feature of this new service is Conversational Remote Job Entry (CRJE) which enables you to create and edit programs and data in an interactive mode and then submit them for batch processing. Numerous ASCII terminals are supported for keyboard data entry and output.

Three Popular Languages

You may create and edit programs in BASIC, COBOL, and FORTRAN, the most popular and well-known languages in the time-sharing marketplace.

Excellent Diagnostic Tools

All three languages have their own prescanners that allow line-by-line syntax error checking.

Global Edit Feature

The CTS Editor permits simple global on-line changes of data or program statements. Modification or insertion is done without having to re-enter an entire program.

Applications for many disciplines and industries are available through CTS—our customers may be in aerospace or publishing, construction or finance, and many other fields—because we have the capabilities to meet today's data processing needs.

With CTS, complicated data processing technology is simplified by a series of understandable commands geared to your environment. These commands enable you to quickly generate the information you need.

But we know it is important that you have technical support for CTS when you want it. Trained UCC customer representatives, on the national and local levels, possess the expertise necessary to aid you with your processing requirements. *A toll-free in-WATS number places you in direct contact with operations and systems personnel at our Dallas super center.* They will provide the answers to your questions about system and communications status.

Hardware:

To back our Conversational Time Sharing service, we have well-established UNIVAC hardware coupled with the latest in 1100/OS software which gives you extensive computing power and capability. Hardware components consist of:

UNIVAC 1108 Processor

Over 1.5 million characters of core storage

UNIVAC 8433 Disks with over 200 million characters of storage per disk pack

UNIVAC FASTRAND drums with over 132 million characters of storage per drum

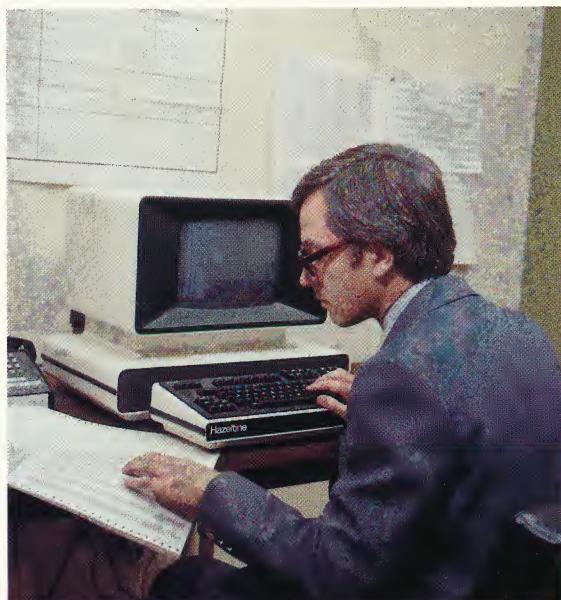
7 and 9 track tapes with 556, 800 and 1600 BPI

Printers and card readers

Security:

The protection of confidential data is another essential service that UCC provides. A series of user I.D.'s, passwords, and site I.D.'s unique to each customer ensures that proprietary data will be available to authorized personnel only.

Conversational Time Sharing from UCC can be the answer to your data processing needs. This new service allows low-cost entry into the world of benefits that high-powered computing provides.



United States Offices**BOSTON**

3 New England Executive Park
Burlington, Massachusetts 01803
(617) 272-6350

CHICAGO

120 South Riverside Plaza, 10th Floor
Chicago, Illinois 60606
(312) 368-0995

DALLAS

1930 HiLine Drive
Dallas, Texas 75207
(214) 655-8894

DETROIT

5600 Crooks Road
One Northfield Plaza
Troy, Michigan 48084
(313) 879-9300

NORTH BRUNSWICK

850 U.S. Rt. 1, 4th Floor
North Brunswick, New Jersey 08902
(201) 828-3900

HOUSTON

Suite 140 West, 4801 Woodway
Houston, Texas 77056
(713) 961-3444

LOS ANGELES

888 North Sepulveda Boulevard
El Segundo, California 90245
(213) 322-3093

NEW YORK

747 Third Avenue, 32nd Floor
New York, New York 10017
(212) 421-8850

SEATTLE

1450—114th Ave., S.E., Suite 114
Bellevue, Washington 98009
(206) 453-8829

SAN FRANCISCO

44 Montgomery St., Suite 2870
San Francisco, California 94104
(415) 421-6240

ST. PETERSBURG

9500 Koger Boulevard
Suite 206
St. Petersburg, Florida 33702
(813) 576-7373

TULSA

823 South Detroit
Tulsa, Oklahoma 74120
(918) 582-0975

Canada

101 Duncan Mill Road
Suite 404
Don Mills, Ontario M3B 1Z3
(416) 444-4471

European Offices

Austria
Belgium
France
Germany
Ireland
Netherlands
Switzerland
United Kingdom